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FROM THE EDITOR

Everything is quiet. Too quiet. IBM began shipping their PowerPC based machines—not as powerful personal computing machines, however, but as workstations, outfitted with their AIX Operating System. And the price was high, making anyone who noticed wonder how Big Blue will market this same basic hardware in the personal computer market once their Workplace OS is ready. Regardless, it was a quiet launch, and it appears as if IBM would rather that no-one notices these new machines for now.

Things are quiet at Microsoft, too. News slipped out that Windows '95 would be further delayed, with the release now pushed back to August. A number of analysts are guessing that the software giant's soft-spoken announcement of the August date may be wishful optimism.

Things are finally quiet at Intel, too, after their somewhat meek apology over the Pentium math bug fiasco. Sure, there's been a low rumbling about how some of the replacement parts are apparently overheating, but Intel was quick to 'fess up to that problem, and promised that they were looking into it.

Apple? Mostly quiet there, too. Some rumors spreading a couple of weeks ago of a possible hostile takeover attempt hit CNN, but seemed to quickly vanish without a trace. The new PowerPC hardware standard agreement struck with IBM and other PowerPC partners caused a minor wave, but an announcement that they would push back the release of MAC OS for that platform took a lot of wind out of that sail. Even the announcement that Apple had shipped their one millionth PowerMac a couple of months ahead of projection seemed to fizzle.

It seems, overall, as if there isn't any real news in the higher-end platforms; all the companies are busy working making the newer hardware they've been heralding as the next generation of computing do something a little more spectacular than the last generation of hardware. But they're all months away from making any big releases that will have any major impact, and they've already been talking those products up for months.

The Commodore market, however, is seemingly ablaze over the announcement of fax software finally becoming a reality. Yes, we're years behind the other markets on this kind of development, but it's a big deal for us. In many ways, you might compare it to what's happening in those other markets: new hardware is here, has been here, but software to take full advantage of it is both lagging and lacking.

As I look back over the past year, this becomes even more apparent. There just aren't enough programmers developing new and exciting software to take advantage of all the hardware we have in our market. And it's a shame. Because we've got a lot of powerful peripherals—both Commodore-specific and those adapted from other platforms—to make our Commodores do a lot more than they do today. But we'll never realize that potential without more active development of software that explores new territory and addresses the short-comings in the programs we already have available to us. If you're a programmer, consider these factors before you write the ten-thousandth directory editor that does one or two things better, but lacks many of the features and power available in dozens or more similar programs. Create programs that do things better, that offer more than the others without leaving out features. Write your programs lean, fast, and powerful. People are looking for your next program if it follows these guidelines. And the entire Commodore market will take a giant step forward for each such program you create!

Doug Cotton
Editor

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BACKTALK

LETTERS AND QUESTIONS FROM OUR READERS

Keep it Simple

Dear Backtalk,

I've just finished reading my Issue # 5 of Commodore World and once again I've really enjoyed it. But the one letter which addressed the issue of devoting more time to the mature market, your answer was right on line.

Although I've owned my Commodore 128 for a little over two years, I would still consider myself a new user. I bought my C-128 for a good price. For the computer, monitor, and disk drive. All I wanted was a word processor, but for the price I could not past up a good deal.

I had no previous computer experience so I needed lots of help. The first place I looked was into a Commodore User's Club. The were users helpful in providing me with the basic to get me started. But eventually I want more.

There were other magazines and disks available, but none really seemed to give me what I wanted. Then came you... COMM0DORE WORLD. I was and still am impressed with each issue. Your ability to ranch every user of the Commodore Computer is what makes you so great.

Through the user clubs. I've purchased GEOS and FGM, but it wasn't until your magazine that I realized the full potential of each program. Your articles are so easy to read and to follow. When Tenex stopped supporting C64/128 hardware, who came to my rescue? YOU and CMD, Inc. Thank you.

Your magazine has taught me how to enjoy my C-128 many times over, and the support that CMD, Inc. gives is virtually untouchable. What a winning combination for all Commodore users.

I really enjoy all the 'Features, Reviews, Columns, and Departments' so well written. And thanks to the section 'ON THE HORIZON, I will probably order the newly available CMD HD-20 hard drive by the time you receive this letter. And when I read •TOP TIPS, and learned that there is a GEODRIVERS 1 disk, I realized that I may be able to get my 24-pin Epson color printer to actually print in color.

So in closing, I would just like to say please keep up the good work, the great articles, and don't ever forget us newer users, because I always believe that there's room for more.

Sincerely,
Ed Stubbs

Commodore World reserves the right to edit letters published in this column for length, spelling, and clarity. If you have questions or comments, write to: *CW Backtalk, c/o Creative Micro Designs, Inc., P.O. Box 646, East Longmeadow MA 01028.*

C128 Tricks for HD and RAMLink

Partitions of both CMD hard drives and RAMLink can be accessed directly from Digital Solutions Pocket 2 series for the C-128 by the following series of commands: C=, n, RETURN, where n is the device number of the HD or RAMLink. This would bring up the directory of the default partition. Thereafter type C= c c p m, where m is the partition you want to access.

Incidentally the Timeworks Word Writer 128 and Swift Calc 128 will also access the RAMLink and HD hard drive directly by pressing first the ESC key, then press the SWAP 8 key of the HD or RAMLink, move cursor to DISK COMMANDS, RETURN, then move cursor to MS-DOS COMMANDS, RETURN, and finally type c p n, where n is the desired partition number. The same routine cannot be carried out with Data Manager 128.

Finally the partitions can also be accessed directly from Fontmaster 128. After having booted up the program for word processing make sure that the HD or RAMLink are device #9. Then press CONTROL and d simultaneously; type > c p n, n being the desired partition number.

Sincerely,
Dr. Warner M. Linfield

Good information. We get a lot of questions about CMD device compatibility with these programs. I am sure many of our readers will benefit from these helpful suggestions. This is precisely the type of information we want our readers to send us. If you have any suggestions, help your fellow Commodore users by taking the time to write us.

SCSI Questions

I want to upgrade my HD-40 with another SCSI drive mechanism. But, what's the difference between SCSI hard drives, SCSI-2 hard drives, and Fast SCSI hard drives? And which do you recommend that I go with?

Stick with SCSI or SCSI-2 drives. The SCSI-2 specification is backwards compatible with the older SCSI standard, but allowed for some optional capabilities for faster and wider data paths. These latter options are implemented on Fast SCSI and Wide SCSI mechanisms.

geoWrite Error

I have a Commodore 128-D with built-in 1571 drive, a BBGRam 2MB, 1541-II drive, FD-2000 drive, JiffyDOS 6.01, gateWay, and geoWrite installed in the BBGRam.

Recently, when using geoWrite in 64 mode, after entering data and usually updating after each paragraph, quite often the computer locks up with the following message on the screen:

B COh

In most cases, I do not lose data from previous updates; this has just started the past couple of months.

Also sometimes, at the end of page 1 of a 2 or 3 page document, I get an error message: ERROR I:86. PLEASE HELP!

This type of error sounds like a corrupt file. I would recommend that you first try installing a new copy of geoWrite (copy it from your original GEOS Applications disk) to see if that corrects the problem. If not, or if it only corrects the problem temporarily, you may have one of several other problems. The RAMdisk disk driver in gateWay may not be working

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correctly with the BBGRam. Although it is our understanding that this unit is identical to a GEORAM, we have not had one to test, and the possibility does exist that the two may not be fully compatible.

Secondly, you may have a problem with contact between the BBGRam and your expansion port. This can easily be corrected by inspecting the port and/or cleaning the contacts on the cartridge (refer to Issue #2, page 26 of Commodore World for tips on checking the expansion port).

Finally, it could be the BBGRam itself. Such problems can be caused by marginal RAM chips, or some type of glitch in its power backup system. If this appears to be the cause, contact the manufacturer for details on repairing it.

Magic & MS-DOS?

First of all- You have a first-rate, quality magazine for the Commodore 8-bit computers. I got the first three issues, and have turned them into dog-eared copies! Keep it up...

A few suggestions: How about a 'Magic' column similar to the ones that appeared RUN Magazine? And try to limit the contents to new stuff, i.e., not the ones that already appeared on the Internet newsgroup comp.sys.cbm. And try to include more machine language stuff. I know you have to pander to the lowest common denominator regarding readership—I think this is a 'mature' market, and we need more technical information to use our machines more effectively.

Allow me to comment that my current computer set up consists of a flat C-128, 1571 disk drive, (both with JiffyDOS), 1541 disk drive, FD 4000 and HD 85 disk drives, Xetec Super Grafix Jr. Interface, SwiftLink, Super Snapshot v4, tons of computer software, and a equal number in books and magazines. I also have a IBM 386sx20 MHz comp. with 170MB HD, 5 Megs of RAM, VGA monitor & a HP 560C printer.

All of this brings me to comment on Mr. Christianson's commentary in the first issue of Commodore World regarding the 'rat race' of the MS-DOS world. This is just basically comparing apples with oranges. I use both machines, and derive satisfaction from both. Both of them require expensive up-keep and up-grading, albeit more so on the MS-DOS part. While I have been a Commodore user since 1983 (with a Datasette!), I have invested significant amount of time and money. Despite my investment, I am a realist, and continue to use other computer platforms which are currently viable. And what's viable right now is Windoze running in MS-DOS environment on a 486 speed demon. It has support virtually anywhere I go. If I need support for my Commodore, I'd have to go to the used market, or direct mail retail outfits such as CMD, Software Hut, SSI and Grapevine Corp. My having an MS-DOS compatible computer doesn't necessarily mean an admission on my part that Commodore computers are inferior. Also, it is not an endorsement on my part that 486DX33 machine running Windows 3.1 is a perfect machine. I liken it to purchasing brand name products, when generic ones can be sufficient and maybe even be superior.

The bottom line: I use the computer for what I need it to do- provided the support is there. Why get a Pentium when most of its raw computing power will be wasted on mundane applications like word processing, database and spread sheets? (Which are a dime a dozen.) Not many people require specialized applications such as graphic work, desktop publishing, extensive scientific work which would justify such a purchase. If people feel that they need to upgrade, then they are more than welcome to join the 'rat race'. My 386sx 20 MHz computer is more than adequate for most of my needs, and I have no desire to upgrade anytime soon. I suspect that there is now an anti-upgrade trend growing in this nation and may profoundly affect the computing industry. And all the 'marketing' in the world will not be able to reverse that.

As for my Commodore computing, it is still active—I am currently undertaking two programming projects, and hope to get them published somewhere. My other goals is to hopefully start a disk-based magazine or a BBS in the future. Also, it is my hobby—I am continually collecting Commodore items and have quite a sizeable assortment of commodore products. My most esoteric item in my collection must go to this transparent flow-chart drawing guide made by CBM.

Last of all, I want to thank you for supporting our 'Lazarus Machines', when at this time a lot of companies already bailed out for greener pastures of CDs, MS-DOS computers, Windoze version 3 billion point something, etc. Until next issue, long live the Commodore 64 and 128!

Sincerely,
Todd Elliott

Mr. Christianson responds:

The intention of our Top Tips column was to provide something similar to RUN's Magic column; but to work effectively, it requires a lot of input from users—something we could use a lot more of.

As for your comments regarding the "Over The Edge" article from Issue 1, I think that we both believe that there are certain tasks to which some computers are better suited. However, your example reinforces my point. You're hanging on to a 386sx20 because it suits your needs. I urged Commodore users to avoid unnecessary and costly platform changes and to continue using their 64's and 128's for the same reason: If it's not broke, don't fix it!

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4. At the @ sign type

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5. Follow sign-on instructions for access to The Phoenix.

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ON THE HORIZON

COMMODORE AND COMPUTER INDUSTRY NEWS

Landmark Series Lands at Parsec

Recently Paul Murdaugh, the author of "The LandMark Series" and other software, has left the Commodore market. His software and the rights to it were bought by James Robbins. Parsec has become the exclusive distributor of The LandMark Series, and the software will also be available through our authorized dealers.

Unfortunately Paul's records were not complete and we have not been able to contact all of his former customers. Any of his customers that have not been contacted and are interested in the new upgrades being offered should contact Parsec by August 1995 at the below address and include a photocopy of their canceled check, front and back. All other inquires can be sent to our POB address. GEnie members can contact us at the e-mail address "JBEE".

Parsec, Inc., PO Box 111, Salem, MA 01970-0111

CMD to Distribute New Game from Electric Boys

Creative Micro Designs, Inc., has recently announced that they have signed a North American distribution agreement to market games produced by Electric Boys Software of????, England. The first title making its way to the American market is *Heavenbound*, an arcade-style game featuring advanced graphics and sound.

CMD spokesperson Charles A. Christianson cited the agreement as a boon for the starving North American 64 game market, which has suffered from a lack of new releases for the past few years. "Because the European market has always been more game-oriented, and because the Commodore 64 has maintained a stronger hold in those countries, there are a number of new titles which can be made available here. Heavenbound will be the first of these which we will make available, and if it does well, there are a number of other titles under consideration which could follow."

Price and release date had not yet been determined at press time, but indications were that Heavenbound would retail for under US$20.00, and should begin shipping within a month.

Creative Micro Designs, Inc., P.O. Box 646, East Longmeadow MA 01028-0646. (413) 525-0023 (information), (800) 638-3263 (orders), (413) 525-0147 (fax).

Commodore World Subscription Contest

Commodore World has announced a Super Subscription Sweepstakes, offering prizes to both new subscribers and subscribers who renew their subscription before May 1, 1995. A drawing will be held on the expiration date of this sweepstakes, with the grand prize winner their choice of a CMD HD-20 hard drive or a CMD FD-4000 disk drive. Six second place winners will receive their choice of a JiffyDOS 64 or 128 system, and 24 third place winners will receive discount coupons for $10.00 off their next CMD purchase of $50.00 or more.

New Products from Performance Peripherals

Performance Peripherals, Inc. has recently announced that they will distribute the Flash 8 accelerator in North America. The Flash 8, manufactured by Discount 2000 in Germany, is an 8 MHz 65816-based accelerator card that fits into the expansion port of a C64. PPI has not announced when production units would be available, and did not yet have a firm price, but suggested that the product would probably sell for just under $300.00. Currently, the Flash 8 works only on true C64's, and will not work on C128's in any mode.

PPI also announced that they will distribute the Australian produced product 64 Net, which allows up to four C64's to be networked together using an MS-DOS machine as the file server. Each of the 64's connected to the server can access files stored on the server's storage devices. No pricing or availability for this product has been announced by PPI.

Performance Peripherals, Inc., 5 Upper Loudon Road, Loudonville, NY 12211, (518) 436-0485.

GEnie Helps Santa Spread Christmas Cheer

The Commodore Roundtable on GEnie recently celebrated Christmas with their Twelve Days of Christmas promotion. On each of the twelve days, members got a chance to win prizes in the nightly conferences. The prizes included a large number of free on-line time packages donated by the Commodore Roundtable, and a dozen prize packages containing various Commodore products donated by Creative Micro Designs.

The promotion also included a contest which awarded a complete RERUN disk collection to the member who submitted the best Christmas card produced on a Commodore. This competition was judged by Steve Vander Ark, and the winner's submission will appear in the next issue of Commodore World.

Sherry Freedline, coordinator of the promotion, deemed it a great success, and was optimistic about similar promotions in the future.

Commodore Liquidation: Still Going...

Yes, just like the Energizer bunny, the Commodore Liquidation process seems to keep on going with no end in sight. CEI's bid, tendered in December, had an expiration date that ran out at the end of the year. The Commodore UK team also placed a bid during that time. CEI has reportedly submitted a new bid, at a lower price; we can only assume that the plan is to indicate to the liquidators that as time goes on, the assets become less valuable.

Switching now to the rumor mill, the buzz making the rounds now is that Commodore UK doesn't have the funding to back up their bid. We've heard this rumor before, though, so we're a little skeptical about taking it at face value. There are also unsubstantiated reports going around that the

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Bahamian courts have ruled to allow the creditors to check back for 12 months into the operation of Commodore prior to the liquidation, as opposed to going back only 3 months as is the norm under Bahamian law. If true, this may allow the liquidators to reclaim certain assets by reversing corporate decisions affecting the assets of the company during that period. The down side is that this will undoubtedly add to the delays in finalizing the disposition of Commodore.

One final rumor making the rounds is that a class action suit by Commodore stockholders is in the wings, awaiting the results of the liquidation.

U.S. Robotics Sportster V.34 Upgrade Information

If you own a Sportster V.FC modem, you can upgrade to V.34! Order the V.34 Upgrade Kit, which includes a user-installable EPROM chip, or send your modem in and U.S. Robotics can install it for you. To place your order, call the number below. Be sure to have your modem's serial number when you call.

United States: 800-543-5844
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When in Phoenix...

The Phoenix Network has moved from Flagstaff, Arizona to New Hope, Minnesota. In doing so, it changed their Sprint/Telenet access. Some callers from some cities can still log on using the old "C FYREBIRD" command, others may experience problems. For those experiencing problems, The Phoenix Network suggests using another code, instead.

To connect to The Phoenix Network, have your modem dial your local Sprint/Telenet number. If you don't know your local Sprint/Telenet number, call The Phoenix Network at 1-800-869-1155, and they will look it up for you. When you see "Connect" type the following, depending on your baud rate:

300-1200 baud, type:	(RETURN) D (RETURN)
2400 or 9600 baud, type:	D1 (RETURN)
At the @ sign, type:	C FYREBIRD (RETURN)
If you receive an error message, type:	G1260433 (RETURN)

Gazette Disk?

There's been no word yet on what will happen for the subscribers of the Gazette disk, which we reported last issue as being the latest Commodore publication to fold. Tom Netzel, former Editor of the Gazette disk, now spends most of his time maintaining two areas owned by GFI on America On-Line. While Mr. Netzel was hopeful that something would happen soon, he further commented that he felt certain that subscribers would be compensated in some manner for any outstanding portions of their subscriptions. Commodore World will continue to follow this story, and we hope to have more definite news in our next issue.

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THE CONNECTION

NEWS FROM COMMODORE-RELATED VENDORS AND PUBLISHERS

LOADSTAR

WHO'S IN CHARGE?

The computer revolution is still coming full force. America is only beginning to learn how fun and useful computers can be. Trouble is, corporate America has its mitts in the computer industry. I think the revolution is best handled by actual computer geeks, not people who pay other people $40,000 per year to configure their LAN so they can Email memos. These people have no idea what computing is all about. To them computing is all fads and trends.

The corporate entities I speak of aren't the corporations that actually produce computers, peripherals and software. Intel, MicroSoft, IBM and the like are actually TRYING to make products that they think people want. The villains I speak of are the Prodigies, AOLs and Compuserves. Add to that list is a growing number of media houses such as CNN, CNBC and the like, who lock out their own viewers, especially Commodore users, by nesting themselves in forums on on-line services. I have no problem with the forums. I do, however, have a problem when CNN tells me I have to have a subscription to CompuServe, which has Internet access, in order to communicate with them. Like a lot of other large organizations, CNN probably has it's own Internet access independent of any on-line service. On their daily Talk Back America, they tell use an exclusive live CompuServe forum instead of live Email like CSPAN. They tell you to join CompuServe and type "GOCNN." Sorry, I'd rather go 64.

Let's face it. I'm a political animal. It used to be PC meant Personal Computer, then it meant Political Correctness. Now, and possibly forevermore, it's both. If it's not DOS or Mac, you're a weirdo. So it's no surprise that even though it's the American way to glean as much money as possible from all classes of people, PC actually overrides capitalism. It doesn't matter that there are millions of potential Commodore customers, they just don't want us! Qlink's demise was AOL refusing a heaping serving of Commodore money.

Prodigy absolutely refuses to honor anyone but the PC, not because of any nefarious motive, but because of ignorance. Just last week Fender and I pinned a Prodigy representative in the corner, explaining how Commodore money was as green as PC money. No matter how we explained that they could simply pay a Commodore programmer a few thousand dollars to code a Prodigy front end, the rep simply believed that a Commodore wasn't "fast enough" for Prodigy. Well DUH! What are people doing on-line that a Commodore can't handle? People are incredibly slow on-line, much slower than Prodigy or the Commodore. Modems are incredibly slow to computers. Even a 9600 baud modem is slower than a 1541, especially on a noisy line. So because of PC and ignorance, Commodore users are locked out yet again.

I spend about $10.00 per month on-line. Sometimes a whopping $17.00. So I'd rather spend a fraction of a cent to tell Rikki Lake's producers that she's stereotyping men than to open up my Visa card to CompuServe. I won't write a letter. I may be a political animal, but I'm an electric animal. I don't mind the computer end of writing a letter, but I hate printing, signing, folding, enveloping, addressing, stamping and finally mailing real letters. I'd much rather Email through GEnie, my Internet provider. If GEnie provided an Email to US Mail service, I'd use it, even if it cost 50 cents per letter! I already use their Email to FAX quite a bit. Email is less trouble, and if it gets lost in the Internet because I misaddressed it, the letter is bounced back so that I'll know.

I'm no commie, but I want these fat capitalist pigs and their deals to leave the market the way natural selection would have molded it. Hopefully there will be no centralized on-line services because it'll all be local, with too many businesses, like your local paper and news, ready and waiting to receive your modem for pennies—or free. While the traditional on-line services madly gobble up and shelter new customers from the freedom of Internet and knowledge, they stifle communication.

What I'd like to see is a program that allows green Internet surfers to choose from an English-speaking Big Dummy's Interface To The Internet. Pretty soon people will realize that it's cheap and the ultimate access channel. I hope the future arrives free of PC. Let the users forge the computer industry, not the fat cats who literally tell us what we want and need.

- Jeff Jones
Associate Editor, LoadStar

dieHard

The dieHard Letter

dieHard has taken another turn. Exit one associate Editor, enter one Assistant Editor. On top of all this, the price of postage has gone up.

dieHard has been consistently late. The Spinner has been very, very late. People are wondering if we are still around. I don't blame people for being scared. Many C= pubs have come and gone. But we are still here!

Due to not only the postage increase this January, but the cost of printing, dieHard has not been moving in a forward vein, at least not a very fast forward vein. We've been unsuccessful in finding a disk copying system, so those couple of thousand Spinners have been copied by old 1541s! We killed four last month within two days.

That's not all. I've been doing these 100 hour weeks and I've decided that enough is enough—we're going bi-monthly! Actually, we've been putting out 20 issues of dieHard per year, not 10. The Spinner is full of articles as well as programs. So the change will not be one of simply going bi-monthly, we

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will be going monthly.

This is the proposed schedule:

January — Spinner
February — Flyer
March — Spinner
April — Flyer
...

Every month there will be either a dieHard magazine or a dieHard disk. This schedule will give us the time to get out a top-notch magazine/disk in a timely manner.

That brings me to the next topic. We have a new Assistant Editor on board—Jon Steele. Welcome aboard, Jon.

The next issue of dieHard is our exciting GEOS issue. Dale Sidebottom is back with some interesting information That every commodore owner should know. Join Dale in the world of Postscript printing.

Dick Estel takes us for a walk down the GEOS Hall of Fame, where you'll find some amazing individuals. Dick even speculates on future Hall-of-famers.

That's in the Flyer. On the Spinner you'll find some envelope templates, some new fonts, and a double-strike printer for the Epson MX-80 (also works with Canon BJ-200!) from Ernest Barkman. Those fractal (non-GEOS programs that we had to bump from the October Spinner will also be there!

By the way, we have plenty of non-GEOS material in both, so please don't avoid this issue if you loath GEOS.

On behalf of myself and all here at LCI, I'd like to wish you and yours a Happy and Prosperous New Year to all!

- Brian L. Crosthwaite
Editor, dieHard

COMMODORE CEE

COMMODORE CEE

New year, new name, new magazines. So what else is new? Well, a lot more changes. New writers you will see throughout the year. A new column by Jim Hehl covering the Plus/4 and other orphaned computers. More disks per issue. We now offer Commodore Cee on three 1541 format disks or on a 1581 format disk. Same content in both formats. Gaelyne Moranec is going to Australia and is no longer our Editor. Our connection to our Australian friends has changed and we now print Commodore Network of Australia here in the U.S. and distribute it for North America. They in turn duplicate and sell our disk magazine in Australia.

While Commodore Network is a printed magazine and Commodore Cee is a disk magazine we will still be distributing the disks that come with your subscription to Commodore Network. In Australia Warren sends them out about four times a year. We will also, even though we promise twice a year. That's just to give us a little leeway in case the mails or the government folks at Customs delay things. Sometimes that may also delay Commodore Network itself a week or two. I have been lucky once or twice in the past and received packets from Australia in a few days. The norm is two to four weeks depending on U.S. Customs. My December issue and the masters for the January issue arrived on the same day even though mailed weeks apart.

We will still be offering the back issues of Cee-64 Alive! for sale and in a few months we will be offering Compendium Volumes of the back issues of Commodore Network. Each Compendium will come with the disks that were issued with that Volume.

If you are curious about either magazine send for the Demo issues of both. See our advertisement in this magazine for our address and ordering information.

We will soon be offering a lot more software and hardware for the Commodore computers. Flyers for the other things come with the demo issues and with subscription issues of both magazines.

When we first negotiated this distribution with Commodore Network they wanted us to produce a North American edition leaving out club info and Ads from Australia. We convinced them that there are some very good magazines produced in the U.S. (you're reading one of them) and that what U.S. folks wanted to see was what was happening in the rest of the Commodore world (bad pun intended). So, these issues are unchanged and will contain all that is in the Australian edition. Anything additional will be on pages printed additionally here for U.S. distribution.

- Jack Vander White
Publisher, CEE-64 Alive!

FUN GRAPHICS MACHINE

THE FGM DEMO-ER

This month we're going to explore some ideas for the DEMO-ER section of FGM. DEMO-ER has the full hires editor available, just like CREATOR, with one important difference; DEMO-ER lets you record the keystrokes (rather than recording sound or video, it records the keys you press).

DEMO-ER was originally provided so I could show you examples of things that FGM can do. It's difficult to explain with words what FGM does; just ask any avid FGMer and they'll probably get tongue-tied and go into overload. On the back side of the FGM disk are a bunch of demos that I recorded. They are intended to teach you a few things and hopefully give you ideas.

One of the demos shows you how to make a calendar. Since a calendar is essentially just a form, review the calendar demo for hints on making forms (and see last month's article on form making). There is an FGM Calendar Template available, but I think the calendar demo should be all that most users need.

1. ANNOUNCEMENTS: I know of several clubs and at least one tavern where an FGM demo runs continuously, welcoming people and showing events that are scheduled.

2. VIDEO TITLING: Besides just typing things on the screen, you can prepare screens ahead of time. Say you linked two screens across. Prepare two screens and load them to FGM screens two and three so they'll be out of sight. From the home screen you can use TEXT mode's delete to pull parts of unseen screen two onto the home screen. Use SHIFT CTRL [left arrow] to swap screens two and three so you can access screen three.

3. ANIMATED CORRESPONDENCE: Fender Tucker coined this expression for FGM's DEMO-ER. Send a friend a letter done with FGM. Just be careful; if you write a word and then delete it, they'll see that. If they don't already have FGM then include the demo version of FGM (the demo can be found on LoadStar issues 82 and 101, most club libraries, and many on-line services).

4. Doing complicated things to screens that you might want to do often (or you'd rather someone else did). An example is the u.rotate demo on the FGM disk which rotates a full screen ninety degrees. Also, in issue 101 LoadStar published a converter program by Jack Blewitt which takes two-screen wide artwork and turns it into 1.5-screen artwork for those with Commodore 7-pin printers. Nifty.

If you're doing a complicated demo that may need changes to it later (i.e.: announcements) then I suggest recording it in smaller segments and appending the segments together. That way you only need to re-do a segment or two. Text changes are pretty easy with a disk doctor, but only to a back-up (you've been warned:).

Give DEMO-ER a try. It's fun to play with, and its creative possibilities are largely unexplored. Happy Computing!

- Ron C. Hackley
Co-Owner, FGM Connection

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TOP TIPS

100 TERRIFIC TIPS FOR SPEEDING UP BASIC

Tired of pokey programs? Wish you had a bit more zip in your BASIC? This issue's Top Tips come from David Pankhurst, author of Calc II, a C64 spreadsheet.

With the Commodore computers, more speed requires extra effort. To help in your goal of the quick program, here is a compilation of 100 tips that will shave cycles off your execution times. They span the gamut from general to specific, hardware to software, and practical to esoteric (a polite word for weird). Where possible, time saved, in percentage or cycles, is included. Although the amounts are usually small (one cycle is about a millionth of a second), don't forget that when commands are repeated over and over, a small difference can add up quickly.

Input/Output Tips

Without a doubt, the biggest bottleneck in programming is serial I/O. The serial port takes 8-bit bytes and spits them out a single bit at a time, making every byte transmitted a lengthy chore.

1. Use I/O sparingly. The less reading and writing, the less time spent by the computer slowing down to talk to peripherals.

2. Pack and compress written data. PRINTing a number to disk illustrates how much wasted space exists in files; even a leading space is included. Take out spaces, and look to making each byte written hold more information.

3. Use INPUT, not GET. Unlike GET, INPUT needs no other BASIC lines to read in data, and so is much faster. Remember to format your files to work with INPUT.

4. Cut down user input. People are the slowest computer peripheral (at least from the computer's point of view). Keep communication to a minimum; for example, ask for single letter selections (as in menus) instead of whole words (via INPUT).

5. Ask for user input at the beginning. Think of it this way: which would you rather have, a program that runs all night, asking for input each hour, or one that runs unattended? Have all the decisions made before starting the main processing, to avoid waiting later.

We Need Your Top Tips!

Each issue we'll print the very best tips we receive from our readers. Send your tips on using and programming your Commodore 64 or 128 to:

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6. Let the peripheral do the work. Printers can do amazing things today with fonts, character spacing, page formatting, and the like. Let them. By letting your printer do more of the work, you reduce the work the computer does.

7. Buffer Output. Many printer interfaces take data from the computer at full speed, and send it to the printer at its slower speed. Another option is to first print the file to disk, and after the program ends, output the disk file to the printer. Although the total time is longer, printing to the disk is faster than to the printer, so the program finishes quicker.

8. Use a fastloader cartridge. These cartridges speed up the serial port, making for faster loads and saves. Although few of them improve INPUT or PRINT#, they can be used to speed hi-res screen or program overlay loading.

9. Use loads and saves instead of reads and writes. Reading or writing takes up more time than LOAD or SAVE because you need extra BASIC commands to handle the looping.

BASIC Programming Speed-Ups

Watching out for time wasters when planning a program is an excellent way to gain speed, without having to redo work.

10. Avoid joysticks and mice. Besides being non-standard, a lot of computer time can be spent reading these devices. And because some users aren't familiar with them, you might wind up spending more time getting a response than with the old-fashioned keyboard.

11. Use sound, not action. The C64 has a separate chip for sounds, meaning that a sound can be quickly set up, and the computer is then freed for other tasks. In contrast, flashing a message or displaying a response keeps the computer busy a lot longer.

12. Don't tweak sounds. The key to gaining speed using sounds is to set the sound up, and then forget it. Playing with the volume and changing settings defeats the speed advantage of using sound.

13. Overlays reuse variables. When running a program, LOAD can overlay a program over the current one, run it, and preserve the old variables. This means the second program may not have to initialize anything.

14. Use machine language. Rewrite only the most-used routines into machine language, and you'll gain the greatest benefit with the least amount of work.

15. Crunch BASIC. Crunching or compacting programs means getting as much on one program line as possible, most notably by leaving out spaces. Although small times are involved, (about 190 cycles to go to the next line, and 22 to skip a space) they add up.

16. Use machine language SYS commands. SYS commands are a painless way to combine ML and BASIC. Often someone has already written a routine that does a common task, such as sorting. Also, the Computer ROMS contain many useful routines you can call directly, saving time. Using others' ML routines gives you increased execution speed, and saves time in programming and testing.

17. Turn off the clock. Sixty times a second, the computer stops what it's doing, updates the TI clock value, and checks the keyboard. You can save time without sacrificing the keyboard by avoiding the part that updates the clock, via POKE789,53.

18. Turn off the keyboard. You can turn off both the clock and the keyboard with POKE56333,127, for a speedup of about one percent. POKE56333,129 returns to normal.

19. Delete extra colons. Colons take a more time than spaces to skip over. The reason is that a colon signals the computer to gear up for another command. If there isn't one following, about 140 cycles are wasted.

20. Eliminate REMs. REM is a command, telling the computer to read in and ignore everything to the end of the line. The time spent doing this depends on the amount of text following the REM, but with 20 characters of text, about 1000 cycles are wasted.

Variable Tips

Nobody programs without variables, so speedup tips are essential in working with them.

21. Avoid multiple character names. Variable names of two or more characters exact a time penalty of as much as twelve percent. There's a slowdown not just when you create the variable, but also each time you use it.

22. Initialize important variables early. BASIC works by adding new variables to the end of a list kept in memory. When a variable is looked up, the list is searched from beginning to end. The earlier on this list a variable exists, the quicker it's found, so initialize the variable you need fastest first.

23. Initialize arrays last. Arrays are placed on a list immediately after the variable list. If a variable is later created, all of the array variables have to be moved to make room. Since arrays are usually quite large, the time involved in moving them is significant.

24. Be alert to strings. You need them, but you can use them sparingly. Strings have a lot of wasteful traits, most notably garbage collection—a periodic cleanup of memory that can stop your computer in its tracks for minutes at a time. The less strings you create, the faster garbage collection will be when it does happen.

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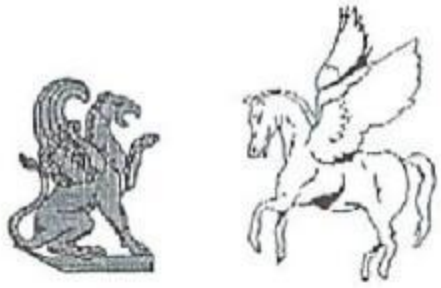

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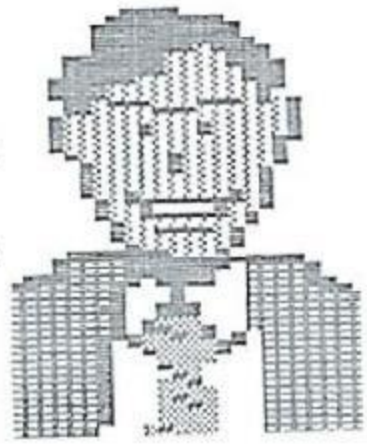

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25. Avoid string math. Every string manipulation requires space. Often, one formula involving a string will make several copies of the work in progress. All of these copies help fill up memory, triggering garbage collection that much sooner.

26. String assignments are OK without math. This is the exception to working with strings. When X$="MOMMY" is executed, no string moving is done. But if you do any math during the assignment, such as X$="MOMM"+"Y", a copy is made, and time spent.

27. Assign constants to a variable if used more than once. Each time a constant is read in, the computer converts it to a number it can use internally. This conversion takes extra time on all but the smallest constants, so you benefit by making most constants variables.

28. Avoid % variables. They should be faster, but on Commodore BASIC, they are translated internally to normal variables, wasting about 300 cycles.

29. CHR$() takes a long time. Here again is math with strings. If you do use CHR$(), consider storing the result in a variable.

30. ASC(LEFT$()) is unnecessary. ASC uses only the first character, so LEFT$() is superfluous.

31. Use LEFT$() and RIGHT$() in place of MID$() whenever possible. They're over 50 percent faster.

32. Unpack data. If you find yourself converting data every time you use it, try converting it once, and saving that version. For example, if you work with telephone numbers, leaving the dash in might save adding it later.

33. Don't DIM small arrays. If you don't DIM an array, BASIC will automatically create an array of 11 elements when you first try to use it. If that's what you need, leaving off DIM saves over 2000 cycles.

34. Use arrays for repeated lookups. Here's one example: instead of constantly using a formula like Y=SQR(X), create an array T(), and fill it with pre-calculated values [i.e., T(X)=SQR(X)]. Then each time you need a square root, look it up in the table [Y=T(X)]. It only works if you need a small range of values checked, but if that's your situation, the time savings can be enormous.

Math Suggestions

Mathematics in the computer works on what is called floating point format, used internally by the computer.

35. Don't do it. Math on the Commodore was programmed to handle big numbers as easily as small. Unfortunately that means all math is slow. Avoid it or simplify it, but remember that it steals a lot of time.

36. Use period (.) instead of zero. Though cryptic, it cuts about 600 cycles from execution times.

37. Variables versus arrays. When an array variable is looked up, the index value has to be calculated, in some cases tripling the time spent.

38. Split doubly indexed arrays into singly indexed ones. By splitting an array like X(10,2) into X(10) and Y(10), you avoid the second index calculation, and run about 50 percent faster.

39. Avoid fractions. Try running X=1 a thousand times, then X=1.0000000000, and notice the difference. Fractions require an incredible amount of time to enter into the computer. Save each one as a variable, and never, never, call more than once.

40. Avoid exponentiation (^). Instead of taking a number to a certain power, try multiplying out. For example, changing X^3 to X*X*X runs five times faster.

41. Watch () usage. In a formula like X=(A+B)*Z, the parenthesis eliminate one multiplication, saving time. But if they're uneccesary, leaving them off saves about 400 cycles a pair.

42. Say no to DEF FN. These functions have to first copy your value into the function, and then execute it. This double overhead can be avoided by writing the function into the program each time you need it.

43. RND(0) versus RND(1). RND(0) is roughly twice as fast, but not as random. And don't use a larger number than one ; RND(111111) does exactly the same as RND(1), but runs much slower.

44. Use booleans. Booleans operators (AND, OR, NOT) are faster than all other math operators. Keep alert for ways they can be substituted.

45. Avoid transcendentals. The transcendental functions COS(), SIN(), EXP(), TAN(), ATN() and LOG() take an extremely long time to get answers. Use them sparingly, if at all.

46. Simplify expressions. Is it possible to change multiplies to adds? Change constants to variables? Combine operators with parenthesis? Every math operation you avoid is a significant improvement in execution time.

Data Advice

Data statements are another area with speed problems. But if you really need them, try these tips to improve their timing.

47. Eliminate blanks from DATA. Leaving out spaces speeds up the READ slightly.

48. Place reused data first. Reading starts from the beginning, so if you reread any data, place that first.

49. Use Selective RESTORES. If you can get ahold of a selective restore (which restores to any data line, not just the first one) you eliminate the reading and skipping necessary to position for a READ.

50. Place DATA outside of program flow. Like REMs, DATA statements take time to skip over, so don't.

51. Place them as close to the front as possible, and together. To perform a data READ, the computer has to find the first line, and then each subsequent one. Although the time involved isn't great unless you constantly reread data, placing them close together and up front does make a difference.

52. Avoid READ entirely. The best advice to speedup READ is to avoid it. Instead, assign variables directly.

The Screen

The screen is another input/output device that hogs computer time. But we'd be lost without it, so here's some ways to have your screen and display it, too.

53. Avoid frills. That goes for sprites, graphic modes, lots of color, and such. Extra code (and time) is necessary to set them up and maintain them.

54. TAB() versus spaces. Generally speaking, if all you're doing in a PRINT statement is formatting, TAB() is fine. But if you're printing a string anyway, a few extra spaces in the string won't hurt, and it prints much faster than TAB().

55. Don't calculate when printing strings. X$=Y$+Z$:PRINTX$ is slower than simply PRINTYZ.

56. Avoid CHR$() in PRINT. Embed control codes (like the inverse S that clears the screen) in strings, rather than calculating them with CHR$().

57. Don't scroll. Each scroll requires 2000 bytes to be moved—and moving takes a very, very long time.

58. Don't clear the screen. Although faster than scrolling, it still takes about 43,000 cycles.

59. Consider loading screens. Very complicated screens can be created once, and then loaded, saving re-creation time.

60. Blank the screen. If you can do without the screen, your code can be speeded up about six percent by blanking it. Use POKE53265,PEEK(53265)AND239 to turn it off, and POKE53265,PEEK(53265)OR16 to turn it back on.

Branching Tips

Every decision involves a potential branch, and branching takes time—time that can be reduced with careful analysis.

61. Use small line numbers on GOTOs and GOSUBs. Like all other constants, they have to be translated by the computer to an internal number. The larger they are, the more time spent converting them.

62. Avoid GOTOs. Not only is it a potential cause of spaghetti code—code jumping from place to place in a tangled mass—but it takes time for the computer to get the line number, find the destination, and move there. If you can do the job where you are, do it.

63. Avoid GOSUBs. This is the same advice as for GOTOs. The difference is that GOSUBs usually serve a different purpose. Often one routine is used by several parts of a program, and each call it with a GOSUB. If a subroutine is used in several places, there's probably not much you can do. But if you need speed, consider moving the subroutine in-line with the code, eliminating the GOSUB entirely.

64. Consider FOR/NEXT loops instead of GOTO for looping. To use a GOTO for looping involves an increment, a test, and the branch. It's much quicker to replace these three statements with a FOR/NEXT loop; and with fancy programming, even unusual increment values can be handled.

65. Leave off the GOTO in IF..THENGOTO. This saves about 50 cycles.

66. Replace GOSUB:RETURN with GOTO. If you have a GOSUB:RETURN pair, replacing them with a GOTO saves you 500 cycles. The reason is that the computer saves the return address with a GOSUB, but not a GOTO.

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67. Place routines at the program beginning or just behind the calling line. GOTO/GOSUB works in two ways, depending on whether the destination line number is smaller or larger than the current line number. If smaller, searching for a match begins at the start of the program; if larger, searching begins from the current line. That makes these two locations the best place to store routines for quick access.

68. Simplify IFs. The IF command evaluates and goes to the next line if the result is zero, or to the THEN part if non-zero. This lets a test for non-zero be simplified from IFX<>0THEN to IFXTHEN, halfing the time.

69. In a series of IFs, place the likeliest first. Placing the most likely choice first means you avoid falling through to the latter IFs (with extra testing) the majority of the time.

Loops

Nowhere are speed up tips more noticeable than in loops. When a loop is executed thousands of times, every delay is magnified.

70. Include the calculation in the loop. The loop parameters are calculated only once in Commodore BASIC. This means that FORI=X*20TOX*30STEPY-2 is quicker than A=X*20:B=X*30:C=Y-2:FORI=ATOBSTEPC since the extra variables A, B, and C aren't created.

71. Leave off the variable with NEXT. It increases speed by about 13%.

72. USe NEXT:NEXT, not NEXTI,J. Variable lookups takes time, even more than executing two NEXT commands.

73. Change two loops to one. If you have a loop assigning ten items to array X, and another assigning ten items to array Y, combine them into one loop to save time.

74. Do more work each loop. For example, FORI=1TO10:X(I)=I:NEXT and FORI=1TO10STEP 2:X(I)=I:X(I+1)=I+1:NEXT do the same job; but the second loops five less times, with only a small increase in program size.

75. Move out unvarying parts in a loop. If something doesn't change inside a loop, move it outside. And if a calculation is done that never varies, assign it to a variable outside of the loop, and then use that.

DOS

Input/Output time savers have already been discussed, but now we focus on that all important peripheral, the disk drive, and its disk operating system.

76. Use a RAM device. It's faster, so much so that even counting the extra time backing up the files to disk, it can still come out ahead.

77. Kill the Dos Wedge. The wedge haunts BASIC at its very core, a little routine used to read every character of a program. Kill it with @Q, and regain 21 percent of your lost speed.

78. Consider direct access and relative files. These file types take extra programming, but they have the advantage of accessing files much faster than the usual SEQ and PRG types.

79. Keep head movement to a minimum. The head that actually moves over the disk, reading and writing, is the slowest part of the drive. Avoid moving it as much as possible, such as by working on two files at once on the same drive.

80. Don't read unnecessary data from the disk drive. Disk information, in the form of blocks, are first read into a buffer in the disk drive's memory. But if you don't need all the data, send only the bytes you need over the serial port with the DOS Buffer Pointer command.

81. Recognize when you have to buffer via the computer. When most or all of a disk file is being changed or copied, it actually goes faster to first copy to the computer's memory, and then back to the disk.

82. Do selective directory reads. If you have to read a directory in, read only the files you want. Use wildcards to list only files with certain names or file types, such as PRG.

83. Create files early on a disk. When you open a file, the directory is searched from the start for a match. If the file is first, it's quickly found. If it's fiftieth, it will take longer—much longer.

84. Don't keep a lot of files on disk. If you are constantly reading and writing a file, it pays to use an empty disk. When writing a file, DOS has a pattern to finding empty space, which keeps head movement to a minimum. But as more and more blocks fill up, the search for empty space comes to resemble a game of musical chairs, with the last persons whirling around looking for an empty spot. This extra time writing also translates into extra time reading, as the heads have to move farther to find each block of data.

85. Use shortened disk commands. Shorter commands take less time to transmit. Use wildcards for file names, and leave command parts, like the 0: in I0:, off. And never transmit a command like COPY in full—always use its abbreviation.

86. Read the error channel partially. Although it sounds like sacrilege, you can safely get away with a partial read. INPUT#15,X works as well as INPUT#15,X,X$,Y,Z, and significantly faster. And as long as you have the error number, you know what the error was (although not the details, like track and sector numbers).

Programming Philosophies

These last fourteen tips are without a doubt the top ones. The most significant way to save speed is to use that tool between your ears, so keep these points in mind, and you'll see real speed savings a magnitude greater than anything else on this list.

87. Don't generalize. Tailoring the solution to the problem is like tailoring a suit; if fits better and looks better. It runs better, too.

88. Don't use two statements for the job of one. If one statement can do a job in BASIC, more than likely two others will be much slower.

89. Don't re-invent the wheel. This saying, famous among programmers, states the obvious: If someone's programmed it already, why write it again? You gain the benefit of their debugging, testing, and programming, without any of the associated effort. There's plenty of new programming challenges out there without wasting time on old ones.

90. Avoid mistakes. This isn't in the programming phase (although it applies). It's in the running phase. Users each think differently, and they will make errors, which take time to fix. So bomb-proof your programs; the time you spend protecting it is time well spent.

91. Know and understand the problem. How else will you get a solution? And nothing is quite as tragic as wasting time solving the wrong problem.

92. Select good algorithms. Look into faster ways of doing the job. Although the best methods are usually the more complex, the extra time spent implementing them is well worth it.

93. Use good data structures. Like algorithms, good data structures improve the speed of execution. Learn about linked and doubly linked lists, trees, tries, and how they work. And then use them.

94. Practise good programing habits. Although Commodore BASIC isn't structured, good habits can still be practised. Following a pattern to your programming will make writing and testing faster.

95. Make use of tools. If a programming tool helps you design a sprite or a screen faster, or debug your program quicker, use it. We're not in the days of "roughing it" anymore.

96. Watch out for hacks. "Hacks" are non-standard code tricks to do uncommon things (like some of the tips in this list). Use them if you really need the speed, but balance that advantage against the debugging disadvantage. You can spend a lot of time wondering why your program doesn't work, only to find some forgotten hack hidden away, doing odd things.

97. Program with testing in mind. Eventually, you have to test it. So plan ahead. Don't write long blocks of untestable code. Don't make it impossible to see what's going on. And plan to review the output at every stage, to see if it's what you expected.

98. Use a profiler and remember the 80/20 rule. A profiler sits in the computer background, watching your running program. After, it spews out statistics on the amount of time each line of code used. The 80/20 rule states that you'll get about eighty percent of your improvements by focusing on twenty percent of the code. Putting the two together, you can speed up your programming by focussing on where the most time is spent in the program, and speeding up those sections. You'll get the most results for your effort and time.

99. Eschew Obscurification. Make it simple. Simple means easier to understand, run, describe, test, and fix. If you avoid needlessly complicating the program, you'll be glad you did, and so will everyone who comes into contact with it.

So that's it—one hundred ways to save time, and speed up BASIC. That is, with the exception of the last one, which I think deservedly qualifies as the top tip:

100. Remember: speed isn't everything.

Don't become so concerned with saving time that you end up wasting it. Speed up your programs, but not if it means losing your job, your wife, or your mind (not necessarily in that order). Enjoy tinkering with BASIC, but remember to take time for other things as well.

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Just For Starters

by Steve Vander Ark

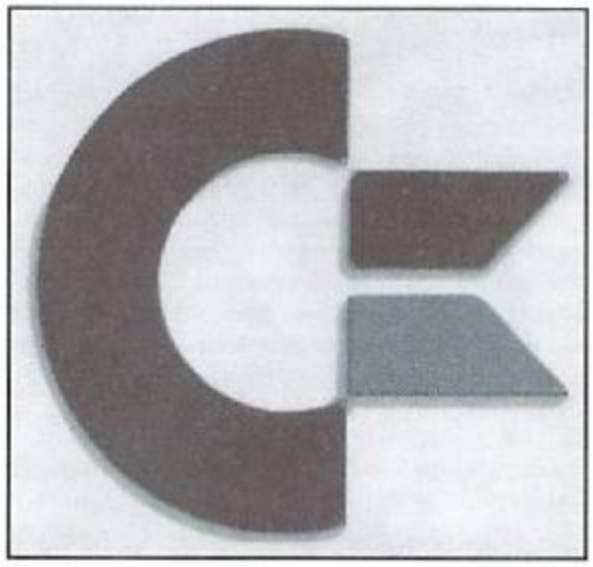
THE BASICS CONTINUE: TELLING YOUR COMPUTER WHAT TO DO ISN'T SO HARD

HELLO. Last issue, we taught our computers to say that. If you weren't here (or if your copy of Commodore World has been eaten by your boa constrictor), you'll want to pay attention to this first paragraph, because I'm going to give you a lightning-fast crash course in BASIC to make up for what you missed. If you were here last issue and remember it all vividly, skip on to the next paragraph. Okay, here we go: BASIC is a way of talking to your computer by means of a series of typed commands. If you want to have the computer follow your commands immediately, you just type them in and press return after each one. If you want to create a series of commands and then have them execute in order after you're done typing, you put a number in front of each command and press return at the end of each command to create a numbered list of commands. Then you type (without a line number) the word RUN and press return to make the computer carry out the commands, one after the other. In order to write the word HELLO on the screen, you type in the following, exactly as written:

```
10 PRINT
20 PRINT
30 PRINT "HELLO"
```

and then press (RETURN). The computer then executes the first line, PRINT, by dropping down a line. The same thing happens again when the second line is carried out. The third line then makes the computer write HELLO on the screen. The reason we counted by tens when we chose line numbers was to allow for extra lines to be added later between existing lines.

Whew. Okay, glad to see the rest of you back. Now we're going to take a look at our program



from last issue. You'll see it printed above. There are a few things I need to point out before we charge ahead to greater things. First of all, you have to understand something about the way the Commodore's screen editor works. Secondly, I think I'd better teach you how to save your work to a disk and then load it back into your computer.

When I'm talking about the screen editor I am talking about the way the Commodore lets you type commands on the screen, fix them, change them, and so on. This is a very interactive process, which makes writing programs very easy. The screen editor uses the cursor keys (those are the ones with the arrows on them) to let you move the cursor around the screen. Where ever you stop and type, that's where the text appears. You can move from one line to another easily, typing and changing to your heart's content.

The program you're writing, though, is stored in memory in the order of the numbered lines. That means that if you type line number 30 before line number 10, the computer sorts them out into numerical order when it keeps track of the lines in memory. It makes no difference where on the screen you type them; the computer always keeps things in order. That means that if you need an extra line, say between lines 20 and 30, you can simply type line number 25 on any blank screen line and press RETURN. Line 25 is now stored by the computer in the correct place. To see that this is true, let's try it. Let's add a line to our program.

If you don't have the program typed in yet, do it now before we go on. The, when it is all ready to go, cursor down a few lines to an open line and type this:

```
25 PRINT "HI"
```

This line has now been added to your program, and even though you see it on the screen at the end of your program, you can see it in its true position by listing the program. On an open line, type LIST and press RETURN. The program will come up on the screen and you'll see that it is in the correct numerical order. You can even type RUN and watch it go.

One other important thing to realize about the screen editor is that nothing really gets saved into your program until the line it's on has had RETURN pressed on it. Here's how that works. If you type a line, you press RETURN at the end. That's almost like telling the computer that you're done with that line and want it officially saved as part of your program. Now if you need to change it, you can use the cursor keys to move back into that line and change what you types. If you don't press RETURN again, however, you will not have told the computer to register the changes, so the line will not be correct, even though it may look correct on the screen.

Another important thing to understand is the way the Commodore uses the quotation marks

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("). When you type quote marks at the beginning and end of a series of words or numbers, the computer takes them at face value. By that I mean that it won't try to actually carry out any command words it might happen to find there. That's why we put "HELLO" in quotes; we didn't want the computer to try to carry out some command called HELLO, we just wanted it to take whatever those letters were and stick them on the screen. The screen editor has a very specific way of looking at those quotes, however. When you type one, you signal the computer to switch into a new way of typing called "quote mode." While in "quote mode" you can't use the cursor keys to move around. Instead, the cursor keys produce strange characters on the screen. Don't worry, that's exactly what quote mode is supposed to do. What you're really doing with those characters is telling the computer to PRINT the cursor keys being pressed. In other words, you can enter a line with those characters in it and the computer, when it executes the line, will actually move the cursor around the screen, just as if you were pressing the arrow keys yourself.

Let's add a line that uses this. Since I can't reproduce those characters in this column, I'll refer to those keys by spelling them out in brackets. LIST your program and then type the following line:

```
40 PRINT "{CURSOR DOWN}{CURS
OR DOWN} THERE"
```

Now, after RETURN is pressed, our line is officially ready to go. Type RUN and see how it looks.

If you ever try to edit a line and find yourself typing those cursor characters instead of moving around, you will know you are in quote mode. In order to get back to regular mode, type another quote (thereby shutting off quote mode) and then press the INST-DEL key to remove the quote mark from the line.

There are a lot more useful tricks the screen editor will do to make your BASIC programs more exciting, but for now let's just worry about saving all our hard work. I realize that at this point it would be simple to just type the whole thing in again, but as our programs get longer and more complicated, that would be impossible. Instead, we can use a command to tell the computer to take what ever program is in its memory and save that program to disk. Here's how it works:

```
SAVE "filename",8
```

The SAVE part is the command itself, the "filename" in quotes is the name you want your program saved as, and the last 8 is an address. You will remember that the computer needs to know where you want your information sent, and that 8 tells it to send the information to the disk drive. If you had more than one drive, you could send your program to drive 9, drive 10, and so on, but for now we'll settle for drive 8. When you type this into the computer (in immediate mode) and press RETURN, the computer will send a copy of your program to the drive, which will then write that copy onto the disk. When you want to get your program back into your computer, you'll type LOAD "filename",8. When you SAVE your work, you'll find that your program not erased from your computer's memory. This is handy because it allows you to save a program you're writing to disk at any point while you're working and then just keep going. Most programmers do this every so often, just in case. That way if the power goes out or some other catastrophe occurs, they can get their program back by simply LOADing the SAVEd copy.

So far we've really only worked with the command PRINT, although we've used the commands RUN, LOAD, and SAVE as well in immediate mode. Next issue we'll add another command or two to our repertoire.

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Foreign Exchange

By Joseph Gaudl

SPOTLIGHT ON GUC: THE GERMAN GEOS USERS CLUB

No doubt some of you have been (or currently are) members of a Commodore computer club. It seems appropriate for C64/128 users to be officially part of this closely knit group of computer peers; we find friendship, excitement and help in the club confines which at times is very similar to a family setting. I personally am a member of both a local and a national computer club here in Austria, and even joined a club out in the midwest of the USA in order to keep tabs on the American C64 scene. All of these contacts have been worth the membership fee, but none compare to the services offered by the largest computer club in the world: The GEOS User's Club (GUC).

What began as a one-man attempt to help local GEOS's users developed into a European club with an information network reaching to places as far away as Australia. Before I explain the benefits of the GUC for the US users, let me give you a historical resume of the club.

The founding father of the GUC is a German named Hans-Dieter Schwarz. Toward the end of 1988, Hans-Dieter published the first GEOS User Post (GUP)—a newspaper for local GEOS users. Two readers of Schwarz's publication soon approached him with an idea for a GEOS club using his GUP for a sounding board. These two men, Juergen Heinisch and Thomas Haberland, took charge of the Post in February 1989, and soon became the president and publisher of the newly formed club and club newspaper .

The GUC's membership grew steadily throughout 1989—first locally, and then nationwide, when it was mentioned in computer publications. Attempts by Heinish and Haberland to register the club with the German government (all clubs in Germany must be registered with the local authorities) failed due to the size and disbursement of the club's membership. It just was not legally possible to have a club with members spread out all over the continent. After many legal hassles, the club finally became a type of company with Heinish

and Haberland filling the positions of President and VP. Interest in the group took off as a result of the club's activities in forums and in the German BTX on-line service. In 1990 the club became so large that the first regional groups needed to be formed.

The club's prestige and importance in the GEOS community grew as each major German computer show depended on the GUC to represent and assist its Commodore and GEOS visitors. Hardware companies and software authors approached Thomas and Juergen when they peddled their wares. Club programmers were encouraged to utilize the club to sell their games, applications, etc. in the newly formed GEOS Professional area. Contracts were signed with the best GEOS minds and experts in Europe and North America in an attempt to make GEOS Professional as complete as possible.

1991 marked the birth of TopDesk (an alternate GEOS DeskTop) and GeoROM (GEOS on an EPROM). GeoROM brought the club a lawsuit from Markt & Technik, who holds the rights to distribute the German GEOS. After a year long legal battle, an out of court settlement was reached allowing GUC to continue to sell the EPROM to GEOS users who can prove they are registered users. Club membership reached an all time high of over 2000 during 1992.

With interest in the C64/128 waning, and with hardware and software companies bailing out of the 8-bit market, the club leadership began to wheel and deal. CBM was approached and asked to check it's stock piles to see if any 64/128 hardware could be located. Commodore was more than happy to dump it's inventory, and the GUC became the best and practically last place to still find accessories for the C64. Other companies were contacted and the GUC opened their very own GEOS shop in Dorsten this year. Membership and GEOS support continue to grow, and the GUC is a power house in the Commodore community.

Now what advantages does this offer our American CW readers? Well, first of all, if you are a GEOS user, sooner or later you will have contact with the GUC. There's just no getting around it. Some of the most prolific and professional GEOS minds are in Europe and they are dying to have their stuff imported to the US market. Those of you using Perfect Print are enjoying the work of Thilo Hermann, a young GEOS wizard who had his start in the GUC. Thomas Haberland visited a GEOS convention in Florida this year to assist US users and push his club, and those of you who are on GEnie will recognize his name.

It's easy to become a club member, even if you live in North America. Just write the club and asked for foreign membership pricing. The GUP is published in German, but there is are special issues in English. Thomas Haberland as well as most of the writers can communicate in our language and are more than happy to help out GEOS users worldwide where they can. You might want to include money for postage when and if you write as it's a club agreement to include about 5 German Marks ($3.00) when asking for help. If you have something to offer the GEOS community, you might want to give the GUC a shot.

In future issues of CW we will have more information on products being developed and offered by the GUC, but in the meantime you can contact them directly at this address:

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WORD TOOLS

TAKE A CLOSER LOOK AT THE TOOLS OF TYPE: WORD PROCESSORS

by Gaelyne R. Moranec

When you process words, you rearrange them, copy them, throw them away, type new ones and try them in different combinations. The cave man's version of a word processor was using colored rocks to draw pictures on walls to share his thoughts with the rest of his society. Eventually paper and ink came into use, but with it came the frustration of dealing with mistakes. The choices were to start again on a new sheet of paper, cover the mistake up with something and write over it, or simply to let the mistake stay for all to see. When typewriters came along, the text was certainly easier to read, but it didn't change the problem of dealing with mistakes, nor did it help when words and sentences needed to be rearranged in order to make the ideas of the writer clearer to the reader. Today, a word processor makes the job of writing much easier, allowing words, sentences, and paragraphs to be rearranged and organized before the words ever hit the paper. And give us new uses for how our words are used.

The term "word processing" has been around for a number years, but like other phrases developed since the birth of the personal computer, but what does it mean? In "The Commodore 64 User's Encyclopedia", I found this description for a word processor: "A program that allows the user to create and edit text files on the screen, and print a *user-formatted* hard copy." The key phrase here is "user formatted". A "text editor" will let you write text, and perhaps will offer some of the features available in a word processor for manipulating your text, but if it doesn't have any options to change how the text is sent to the printer, it isn't a word processor.

Although designed specifically to manipulate text, word processors must conform to a number of general purposes. Someone writing a book may need very different features from someone writing a personal letter, and a business may have other needs such as reports with charts or to send similar letters to different people. Word processors are designed to meet as many different needs as possible, and so include many different features to accommodate these needs.

The Tool Box

Just as a car mechanic uses different tools to accomplish different jobs, the features of a word processor can be looked upon as the tools in a toolbox. Learning what the tools are and how to use them take time and effort, but once learned, it's easy to learn to use similar tools in other word processors. What tools you need to have may vary, depending on the task at hand. Here's a brief look at some of the more commonly used word processing tools. The first two may not seem to be "features" or tools, but it's difficult to use new tools without good instructions and a comfortable environment to use them in.

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Good Documentation

What comes in the box with a word processor can be just as important as the software itself. The documentation doesn't give clear, easy to understand instructions on how to use the software. Even how the manual is assembled can make a difference in how easily it can be referred to while using the word processor. Most word processors come with tutorials which let you learn to use the program in a guided way. Some tutorials combine use of the manual with sample text files, others include their tutorials on disk. Another important documentation feature is a reference for the commands used by the program which can be read at a glance, rather than having to wade through several pages for the information. Last, but just as important, the documentation should be complete, detailing all aspects of the word processor without skimping on the details.

Basic Operation

The look and feel of the word processor, as well as how it how it operates is also important. This is probably where personal preferences of individual users most often come into play. Most arguments over "which is the best word processor" seem to focus not so much on the features of the software, but in how the software operates. Just like we tend to prefer either pencil or pen based on the feel of the tool we're using, so it is with word processors. Even details such as color choices and how the cursor is moved around on the screen are personal preferences.

How the tools (features) are accessed is also important. Whether the word processor uses menu commands or if it uses key commands such as the CTRL or Commodore key in combination with another key affect how the software is used, and is another matter of personal preference. Usually word processors offer a combination of both menu and command driven instructions. Some offer only one or the other.

Disk Drive Support

How the software is loaded into memory, as well as which disk drives a word processor will use is important, especially when you have data on one kind of disk and find the program won't access the disk drive with the data. This isn't as much of a problem with only one disk drive, but for productivity needs, more than one disk drive is essential, and the ability to use more than one disk drive can be an important consideration in the choice of word processor one uses. If it can be loaded from a drive other than #8 is another plus. For those with CMD storage devices, such as a RAMLink, the ability to use DOS commands is another essential.

The versatile sequential file—which can be read or loaded by other software—is the common denominator of text files. Because sequential files they can be accessed by most word processors, I feel it's important that any WP I choose to use have the ability to load and save text in this manner. Another plus is the ability to save and load these files in either Commodore PETASCII or in true (standard) ASCII format. This doesn't have to be the only way text is saved, as many word processors save text in a program file in their own format. Another consideration is whether the software allows text files on disk to be appended to, or merged with other text files. The ability to have the files named in such a way that they are linked for either printing or for other commands is also important, especially for large projects.

MOST ARGUMENTS OVER "WHICH IS THE BEST WORD PROCESSOR" SEEM TO FOCUS NOT SO MUCH ON THE FEATURES OF THE SOFTWARE, BUT IN HOW THE SOFTWARE OPERATES.

Printer Support and Flexibility

If your printer isn't supported by the word processor you're using, it leaves you stuck with words on disk but no way to put them on paper. Printer support in word processors usually come in two flavors: the printer "driver" or "file", or a method of telling the software what commands to send to your printer. Common printer interfaces should be supported, or at least general interface commands should be included in the software, and although not all word processors allow it, parallel printer support is also an added benefit for those with a centronics cable.

Support for Add-On Hardware

Whether the word processor will let you use an REU (RAM Expansion Unit), Trackball, Mouse or centronics cable may or may not be important to you, depending on whether you have the additional hardware. Keep in mind, however, that one day you may have these and want the added features available for them.

Text Editing

The "soul" of a word processor is the text editor, where you type your words of wisdom, the letter to your Great Aunt Matilda or the report for work that should get you the bonus you're after. This is where the tools and options for using the tools come into play. Once the words are on the screen you can select a range of text to move, copy, delete, or sort alphabetically, among other things. This is another personal preference matter, as how the cursor moves on the screen, what the cursor looks like, whether you can type in insert or overstrike mode, and what methods it takes to move from one portion of your text to another vary depending on the software.

The tools available to manipulate the text, and how the tools are accessed and used also come most into play while in the text editor. Usually text is marked in some way and then you select the action you wish to be performed, but some programs allow you to select the action first and then select the text. As I said, it varies from one word processor to another.

Another tool worthy of mention is what I'll call "macros", although it has different names depending on the software used. Macros can be either the ability to use one or two letters and have an entire word appear, or the ability to use just a few keystrokes to send commands to the program. Some word processors allow both types of macros, while others allow one or the other, or none. This is generally considered an "advanced" feature, as most macros are user-defined, and in order to define the macros, you must first know how to use the software.

Formatting Text for Printing

Once your words have been typed in, and arranged in an organized manner, it's time to think about how you will want the text to look like on paper. Hand in hand with text editing is formatting the text for print. When you format the text for printing, depending on the program, it can dramatically change how it appears on the screen, and what you see on the screen isn't necessarily what you text will look like on paper, depending on the word processor, and on what commands you have placed (and where) within your text. Most word processors offer a "preview" mode, so that you can get some idea of what the text will look like when it is printed out. There are word processors which are referred to as WYSIWYG (pronounced "Wizzy-Wig" which means "What You See Is What You Get". In other words, the text you see on the screen is representative of what the text will look like after it's printed. GeoWrite, for example, is a "WYSIWYG" word processor. This article,

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however, is mainly concerned with "post-formatting" word processors. "Post-formatting" is as the name implies, you first type your text, then later change it's formatting for print by adding commands to your text.

Some of the basic print formatting commands can sometimes be set within a menu, these are usually to set the margins (left, right, top and bottom), page length, line spacing, and sometimes the left, right or centering justification. For simple letters, the menu options are probably enough in the way of formatting, but there will be times when portions of your text will need to be set different from the rest. Formatting commands are usually placed just before where the change should take effect when printing. Whether an additional command is needed after the portion of text that is to be printed differently depends on the command given, and the software used. By adding commands to the text itself, you can change a single word or the entire text. There are probably hundreds of different print commands that are used by word processors. A few of the more common ones include ways of changing the appearance of words, such as **bold**, *italics*, and underlining. Commands can affect where words appear on a page by changing the margins, column settings, headers, and footers. Other commands affect where a new page is started, page numbering, and hyphenation.

Additional Features

As a selling point, most word processors try to offer different features from the rest, hoping to entice users to buy their product. Some additional features come built into the program, while others have to be purchased separately.

Spelling checkers are lumped into this category, because not all software companies include them as part of the overall package; with some you'll have to purchase one separately. One of the most important considerations for using a spelling checker is to remember that it won't catch words which are spelled correctly but are used inappropriately. How a spelling checker corrects misspelled words is another consideration; if you happen to be a poor speller, it may be very frustrating to reach for the dictionary for each misspelled word. Some spelling checkers offer a list of possible word choices, simplifying the process of correcting misspellings. The option to

An Overview of Available Word Processors

In preparation for writing this, I was sent a box full of currently available word processors to take for a spin. I've learned a lot more about word processing in general than I thought I knew, and also found I do have some preferences as well as prejudices. I'll do my best to keep both in check as I give a brief overview of each word processor. I found that while all perform the jobs of text editing and print formatting, there are at least two areas where all word processors are not created equal—file handling and disk drive support. This support varied widely between programs, from more than you can possibly use, to the exact opposite. Listing each feature would take up too much room, so I've skipped listing features which are common, and mention only those features which made the package stand out from the rest.

Paper Clip III

Batteries Included and/or Electronic Arts

User Level: Intermediate and advanced users.

Versions: 64 and 128 versions come in same software package.

Manual: 199 page spiral bound manual. 38 page addendum with Electronic Arts version.

Commands: Partially menu-driven with function keys, otherwise commands are sent with control key combinations.

Drive Support: Supports two disk drives.

Document Saving: Saves as PC-III PRG files or as SEQ text files.

Printer Support: Uses printer drivers, and allows custom drivers to be designed.

Hardware Support: REU support for Spell Checker, words can be spell checked as typed when used with an REU (128 version only). Centronics printer cable support.

Text Editing: Allows columns to be manipulated in the same manner as text. Columns can be selected, deleted, repeated, moved, or sorted.

Print Options: Auto Table of Contents feature, chapter numbering.

Other Features: Telecommunications, character set editor, disk copy utility.

Pocket Writer 3

Digital Solutions, Inc.

User Level: Advanced users.

Versions: 64 and 128 versions sold separately. Pocket Writer Dictionary sold separately.

Manual: 72 pg pamphlet style manual for Pocket Writer 2, plus 11 page Addendum for V3.

Commands: Driven with Key commands, (F7 help key).

Drive Support: Loads from Drive 8 only. Working back-up copies can not be made. Will only boot from 1571 or 1541 disk drives. Supports at least one additional drive via a configuration file that can be altered.

Document Saving: As PRG files, can be changed to save SEQ files.

Printer Support: Printer drivers, and user-defined printer files.

Hardware Support: Mouse and REU support for 128 users. REU is used as a RAM disk. Centronics cable support.

Text Editing: Support for line and box drawing, selected text (words, sentences, paragraphs) can be transposed. Undo Feature.

Print Options: Format up to 4 columns of text per page.

Other Features: Interfaces with other Pocket programs, will insert GEOS "Text Scrap" USER files into text.

Superscript

Precision Software

User Level: Beginning through advanced users.

Versions: 64 and 128 versions sold separately.

Manual: 233 pages, softbound. 40+ pages of tutorials.

Commands: Menu- and command-driven

Drive Support: Devices 0 or 1 supported.

Document Saving: SEQ files.

Printer Support: Printer Drivers and user defined drivers. Detailed information for defining printer drivers.

Hardware Support: Centronics cable supported. No REU support.

Text Editing: Math functions on columns of numbers, line tabs for moving to specific lines quickly.

Print Options: Allows linked documents to be printed.

Other Features: Spelling checker built-in, both American and British dictionaries included. Fully integrates with Superbase (a database program); both programs can co-exist in memory at the same time.

The Write Stuff

Busy Bee Software

User Level: Beginning through advanced users.

Versions: 64 and 128 versions sold separately. Requires purchase of V1 software to obtain V2 or other add-ons.

Manual: 60 page pamphlet-style manual for V1, 20 page addendum for V2.

Commands: Menu- and command-driven.

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add words to the spelling checker's dictionary can save a great deal of time in future use of the same program. Computers have a nasty habit of doing what they're told instead of what you want, so be sure you spell your additions correctly!

Math functions, outline support, mail merge facilities, and the ability to convert text files from other word processors are additional features that are nice to have but may not often be used, depending solely on the needs you have.

The Final Word

Unconventional Uses for Word Processors

Just as there are no limits to the types of things you can write with paper and pen, a word processor can be used for much more than the conventional chores like homework and writing letters. By taking advantage of text search routines, you can store the same type of information as you would normally find within a database into text files; you can use these later to find what you need quickly, with the advantage of not being limited by field or record size as you would with a database. For several years now, I've used the same grocery list with minor changes for a semi-annual sale on similar items. Since I've used the same list but saved it under slightly different names, I've been able to spot differences in sale prices over the years. Not to mention the time I've saved in not having to type the same list up every six months.

If you're new to learning how to use a word processor, take your time and start out with **short** writing projects, such as a letter or a list of items. Learn how to use one or two of the tools at your disposal at a time instead of trying to learn it all at once. And do as I say and not what I did—don't try to write the article due last week with an unfamiliar program!

It's a challenge to learn all of the features of a new word processor, regardless of experience with other similar software. Often the best way to learn is to have a project in mind and work your way through it. I'm sure the caveman drawing his stories on the cave walls had to learn what worked best for him by trial and error, taking time to learn which rocks were easiest to work with and which could be tossed at the nearest annoyance. We may think we're a bit more sophisticated today, but that element of trial and error for learning really hasn't changed that much.

Drive Support: Drives 8-11. Can be customized by user. 1581 version stores software and dictionary files in subdirectories, program stays aware of location for dictionary files. HD version same as 1581 version but stores files in user selected hard drive partition and displays time/date stamps on files. RAMLink version similar to the HD version, but installs the minimum number of files necessary and doesn't display time/date stamps.
File Support: PRG, SEQ, and USR files, PETASCII, True ASCII, screen code formats.
Printer Support: Menu for adding printer commands for common use, Printer macros for use of additional features.
Hardware Support: REU support for dictionary files. Centronics support via user added loader program (or request disk when ordering).
Text Editing: Automatic capitalization of first word in sentences (toggled on/off), Sort on 1-10 columns A-Z, Z-A.
Print Options: One pass printing of double column text, Print from cursor, print page then skip to page X.
Other Features: File conversion and translation. Spell checker with V2, BB Menu Maker (disk menu utility).

The Write Stuff and its add-on programs continue to be supported and programmed for by it's original author R. Eric Lee. Other add-on software for The Write Stuff includes:*
BB Talker 64 - Talking version of The Write Stuff 64
BB Talker 64 for Blind - Special version of BB Talker 64
The Illustrator I - Add RUNPaint or Print Shop graphics to TWS text. (64 and 128 versions)
The Illustrator II - Add Fun Graphic Machine clip-art to TWS text. (64 and 128 versions)
Rainbow Album - Separate and print color graphics in TWS. (Requires Illustrator II)
TWS QBB Upgrades - For use with QBB (Quick Brown Box) cartridges. (64 and 128 versions)
BB Templates - TWS text. Over 600 sample business letters and legal forms. 16 page index included.
Reading Teacher - Reading tutor for beginning readers. (Requires BB Talker 64)
Compu-Libs - Create 10 stories using mail merge. Ad-Lib style "game".

**Add-on software must be purchased AFTER or WITH the purchase of The Write Stuff V1 for either 64 or 128 mode, depending on the item ordered.*

Busy Bee Software
P.O. Box 2959
Lompoc, CA 93438
(805) 736-8184 11-4:30pm PST Mon-Fri

geoWrite v2.1

Geoworks (distributed by CMD)
User Level: Beginning through advanced users.
Versions: 64 and 128 versions sold separately. GeoWrite is included with GEOS V2.0, the GEOS operating system.
Manual: Documentation for geoWrite is included in the manual for GEOS 2.0.
Commands: Menu-driven with CTRL key combination commands also available.
Drive Support: Supports up to 3 disk drives.
Document Saving: As geoWrite specific files. Utilities exist to change the format to ASCII, PetASCII or other versions of geoWrite.
Printer Support: Uses Printer Drivers. Add on programs (Perfect Print LQ) allow high quality printing.
Hardware Support: Supports use of REU. Supports RAMDrive, RAMLink, HD Series hard drives and FD Series disk drives with additional software provided by the manufacturer(s). Centronics printer cable, and laser printers with Postscript abilities are supported.
Text Editing: Text is edited by highlighting the text to change and then clicking on the item from the menu bar. View changes to text on screen. Right, Left, Center or Full Justification. Allows "hidden" headers and footers with time and date support.
Print Options: Text is printed as graphics (with fonts and other options such as outlined or bold), or as straight text (but without fonts, or other enhancements). Single sheet or tractor feed printing.
Other Features: GeoWrite is part of an integrated graphic operating system. geoSpell, geoDictionary, geoPaint, and Text Grabber, (allows importing of other word processor files into geoWrite format) are packaged with GEOS v2.0. GeoPaint graphics can be imported into text. Many "third party", shareware, and Public Domain programs are also available for use with geoWrite.

GEOS is a graphical operating system for the 64 and 128, and requires a joystick or mouse/trackball to make choices. geoWrite is a WYSIWYG ("what you see is what you get") word processor, which allows you to select different fonts (the style of lettering used for printing) and view your work on the screen as it will appear on paper.

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Anatomy *of the* Printed Page

by Don Radler

When the teenager who brightens up my home recently asked for a little help in laying out a page for a desktop publishing project, she started a conversation that took me back to my early days as a small-town newspaper editor.

In that setting and in that time, the title "editor" meant reporter and photographer and headline writer and layout man. (It also meant backup typesetter, apprentice pressman and all-around printer's devil. You didn't get paid very much for all those jobs, but you learned a lot.)

My first boss was a printer by trade and a publisher by default; there was no one else in town to put out a local paper, so he was it. Most of his revenue came from job printing, and that's where he placed most of his interest. This gave a young editor a lot of leeway—on the editorial side, at least.

On the printing side, it was a different story. The boss was a perfectionist; for him, every print job had to be letter-perfect. As an example, he printed quite a few posters announcing auctions of farm equipment and livestock, and sold them for just pennies a copy. But even at that price, he centered each line precisely or letter-spaced it to justify it left and right. And if one letter printed slightly lighter than the rest, he stopped the press and placed a paper shim under that piece of type to make it print exactly right. He was equally demanding on each and every newspaper page; all of us who worked for him were glad that press time came only once a week instead of every day. But we learned a lot.

Body type—the kind you're reading right now—was cast in lead from brass molds that dropped into place as you typed on the keyboard of the Linotype machine. Each lead slug that the machine cast became a line of type, which is where the machine got its name. Headlines set in type up to about an inch were cast on a Ludlow machine, one line at a time; first you placed the mold for each letter by hand into a steel form and then you locked the form into place for the slug to be poured. The largest headlines were printed from handset characters made of brass or even of hardwood.

Laying out a page meant arranging all of this lead and brass and wood within page-sized steel forms known as chases and locking it into place with tension devices called quoins. Then you inked everything and pulled a page proof to make sure no typographical errors had slipped past the section-by-section "galley proof" reading and to see that each page looked the way it should. When all the pages passed muster, you started your press run. When that was done, the carriers grabbed their papers for delivery and ran out the door for their bicycles as you wiped off all the ink with turpentine, tore the pages apart, put each piece of handset type back into its proper case, melted down the lead for re-use, and started thinking about the next week's edition.

I could almost see and feel and smell these scenes all over again as I talked with my teenager about how you lay out pages. Then it occurred to me that most computer users who first try desktop publishing (DTP) have no more printing background than my teenager does; even the DTP program manuals must sound strange to them. So I turned our conversation into the article you're now reading.

The article can be valuable to anyone who uses geoPublish , The Print Shop from Broderbund, PaperClip Publisher from Electronic Arts, The Newsroom from Springboard, or any other DTP program.

To begin with, the page is the thing. Whether it's a small page, like those you find in a greeting card, or a large one, like a full-size newspaper page, it must be designed to look good as an entity. If it's going to face another page, the way any Page Two faces its companion Page Three, both pages have to look good together. You accomplish this through careful placement of large and small type (called "copy") and with appropriate use of illustrations (called "art"). It helps to surround each unit of type or each illustration with at least a little white space to separate them. Indeed, chunks of white space can be utilized as if they were chunks of copy or pieces of art; using white space this way can be among the most elegant and eye-appealing of all.

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The art and copy can be centered, which yields a quite formal look, or intentionally off-center, which produces a more dynamic appearance. Nowadays, the off-center layout is preferred for all but the most formal publications. This kind of layout tends to lead the reader's eye into the copy and down through the columns, while centered art tends to interrupt this eye movement periodically, which also impedes the flow of ideas.

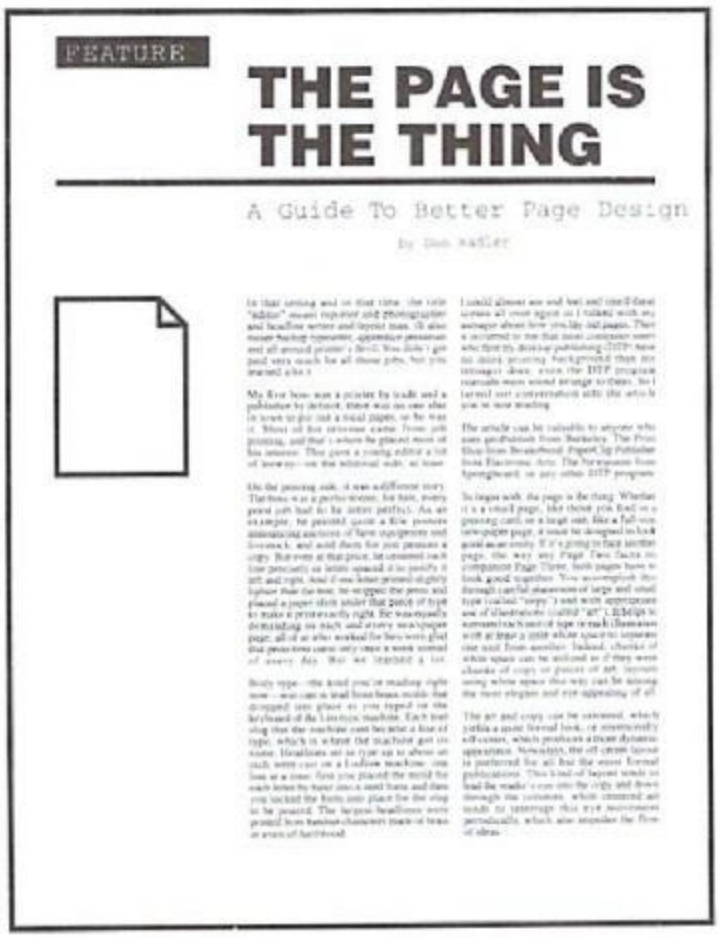
I like to start with the headline, using a sans serif type (one that doesn't have the little cross-strokes at the end of each letter that you see on the type you're now reading). Next, I choose a piece of art. It's best to have the art look inward toward the center of the page rather than looking out of the page; this helps to direct the reader's eye where you want it to go. Thus a man facing to the right of the page should be placed toward the lefthand side, whereas an animal or other creature looking to the left should be positioned on the righthand side. Look over this magazine, or other good magazines, and you'll note that this rule is seldom broken.

Most DTP programs let you select your art, place it wherever you want it on the page, and then type in the copy that goes with it. The program then wraps the text around the picture. If you want complete control of text placement, most programs allow you to type it where you want it during what The Newsroom calls the "photo" stage of the production process, thereby pre-empting the program's word processing feature. You would usually use this extra layout control for positioning "cutlines" that identify or label a picture.

For the body type, a smaller type face with serifs is more readable than a sans serif face such as that used in headlines. And capitals with lower case are preferable to all caps: people find caps and lower case the easiest to read. Body type is most readable when its size is between 10 characters per inch (pica type) and 12 characters per inch (elite type). Take a look at your morning newspaper: odds are the headlines are in sans serif and the text is in serif type, probably sized at 12 CPI. Indeed, look at all the publications you read: they'll give you layout ideas.

Once a block of type is laid into place, you might find that it is shorter or longer than you want it to be. You can kill something to make it shorter, or add something to make it longer. That something can be a letter, a bit of punctuation, a word or a sentence. Most often, however, you add or subtract one or more spaces; once your copy says what you want it to say, you'd rather manipulate spaces than rewrite copy. Spacing between lines is called "leading" (pronounced "ledding"), from the days when blank lead slugs were used between lines to pad things out; the thinner spacers were made of brass, but they were called leading, too.

Spacing between letters is called "kerning"; Webster's says this comes from the French for corner, but I suspect it's really from the Old English for kernel: the little metal spacers look and feel very much like kernels of corn. (The heart of the Commodore operating system, known to machine language programmers as the "Kernal," has the same word origin. In this case, it stands for the fact that the collection of routines comprising the Kernal is the "seed" from which the operating system grows.)


FEATURE

THE PAGE IS THE THING

A Guide To Better Page Design

For a standard 8-1/2 by 11 inch page, a two-column arrangement of body type is usually the most readable. In 10 CPI type, the two-column setup will allow up to about 40 characters per line, which comes close to the maximum number of characters that most people read comfortably, probably because our eyes can hold the line-to-line vertical alignment only up to a certain width. Once that width is exceeded, we tend to lose track of where the last line started and get lost when we slide our eyes back to the lefthand edge of the column.

If your page is the first page (or the only page), a logo across both columns at the top commands immediate attention; your columns are then suspended from that nameplate. An adequate space between columns, called the gutter, should be provided in all layouts, as should comfortable margins left and right and top and bottom. For extra emphasis, you can box your logo, but columns are most readable when the type simply flows from top to bottom and from left to right. Headlines serve as dividers between logical sections; smaller subheads shouldn't be necessary on letter-sized pages, especially in two-column format, unless an individual article runs quite long. Lines or boxes to separate sections shouldn't be necessary either; excessive use of these devices makes pages look choppy and interrupts the flow of ideas from writer to reader.

(If you're working with something like a Newsroom banner and want to follow it with a single column of type going across the page rather than using The Newsroom's two-column format, you can print the banner and then switch over to your word processor. Indeed, nothing says that any layout must be developed using a single program.)

Unlike my first newspaper boss, you don't have to feel compelled to justify body type left and right, and the word processor component of most DTP programs doesn't do this either. Instead, the left side is justified and the right side is "jagged," which is how the type is set in most DTP products. This common arrangement requires the least effort when being laid out. (Proportional text is beyond the reach of most Commodore DTP programs, although it is provided in geoWrite, thanks to the graphical printing mode employed by GEOS.)

Using monospaced text, you might notice that thin letters, such as "i" and "l", seem to be uncomfortably squeezed when preceded or followed by other straight-sided letters such as "m" or "n". By the same token, some letter combinations involving crooked letters such as "r" or "k" seem to be too widely separated. In headlines, this might not look just right; you can make it look better with kerning. In some DTP programs, using the cursor keys with the CTRL key held down moves the typing position one pixel in any direction; this gives you complete control over the placement of each individual letter. (By the same token, standard spacing between lines can often make the descender of a "j" or a "g" fall into the top of a letter in the next line; in such cases, leading is called for. It too can often be achieved using the CTRL key with the cursor keys.)

Whatever program you use for your own desktop publishing work, these basic guidelines on page design should serve you well.

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COMMODORE TRIVIA

by Jim Brain

These trivia questions are my gift to the Commodore Community at large; while other parts of this magazine may not be reproduced without the consent of Creative Micro Designs, Inc., these questions are public domain. I ask only that the article remains intact and unchanged, and that my information appears somewhere so users can contact me. These questions form a contest that I run on the Internet, so you may feel free to contact me for all the relevant information. If you do use them, I always welcome a postcard detailing where they were used. If you have a question, please send it (with answer) as well. Enjoy!

Jim Brain (Internet: brain@mail.msen.com)
Brain Innovations, Inc.
2306B Hartland Road
Hartland, MI 48353

COMMODORE TRIVIA #5 QUESTIONS

$040 The company that produces The Big Blue Reader, a program that allows reading and writing of IBM formatted disk in 1571s and 1581s, is called SOGWAP. What does SOGWAP stand for?

$041 What version of DOS does the Commodore 8280 8 inch dual drive have?

$042 What was the color of the original Commodore 64 case?

$043 On an unexpanded Commodore 64, how does one read the RAM locations $00 and $01?

$044 On an unexpanded Commodore 64, how does one write the same locations?

$045 What is 'CB2 Sound', and on what computers was it popular?

$046 In question $021, the Batteries Included logo description was asked for. Now, what is the name of the man in the logo?

$047 Why was the Commodore VIC-20 produced with so many 1K chips in it? (Hint: It had little to do with the cost of SRAM at the time.)

$048 What does ADSR stand for?

$049 In question $035, it was learned that the Commodore 64 Kernal revision number is stored at $ff80 (65408). Now, what is the number stored there for:
a) The first revision?
b) The PET64 (4064)?

$04A Who was the mastermind behind the original Commodore Kernal?

$04B Who designed the first VIC prototype?

$04C How many pins does a Commodore 1525 printhead have in it?

$04D Why does mentioning a PET computer in France make people chuckle?

$04E What interface IC is used to drive the IEEE-488 bus in a PET computer?

$04F What was the primary reason Commodore went to a serial bus with the introduction of the VIC-20?

COMMODORE TRIVIA #4 ANSWERS

$030 Some people over-answered this question. The correct answer is 38911 bytes, which is what the BASIC screen says. Now, it is true that BASIC can use $C000-$CFFF, and some zero pages is easily used by BASIC, but it is non-trivial to get BASIC to use these areas. The math comes out to: $0801 (2048) to $9FFF (40959) - 1 (0 in location 2048). Please note that this is not the maximum size of a standard BASIC program, even if it does not use variables, since BASIC steals 3 bytes at the end of the program to determine the end.

$031 There are two (or more) answers to this question. The obvious answer is the Commodore 128, but the Commodore SuperPET (SP9000) had two, also. There was also an optional card to add another processor to the B-series. Note that some Commodore peripherals also had two (or more) microprocessors, but that is another question.

$032 Commodore 128: 8502(6510 clone) and Z80. SuperPET: 6502 and 6809. B-series: 6509 and 8088.

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$033 According to my sources, it was none other than Jack Tramiel. While some claim Irving Gould as the man-in-charge since he had controlling interest at the time, the CEO was Jack. Whether he was in charge or not is left up to the reader.

$034 TOD = Time Of Day. The 6526 Complex Interface Adapter is the holder of the TOD clock, which can be used in lieu of the system jiffy system clock to time things, as it does not suffer from interruptions to service I/O and screen. Note that the standard Kernal uses the system clock for TI and TI$, not the TOD clock.

$035 $ff80 (65408).

$036 1.125K or 1024+128 = 1152 bytes.

$037 Chuck Peddle.

$038 MOS Technologies.

$039 MOS = Metal Oxide Semiconductor, which has three major families: NMOS: Negative MOS, PMOS: Positive MOS, and CMOS: Complementary MOS. MOS Technologies produced mainly NMOS ICs, hence the use of NMOS technology for the 6502 and 6510.

$03A CSG = Commodore Semiconductor Group. The renaming was not instantaneous, happening a number of months (years) after the acquisition.

$03B The VIC-I 6560-61, was designed 2 years prior to the design of the VIC-20 computer. It was designed to be built into video games, but no one wanted to use it, so Commodore made their own system around it to recoup losses.

$03C VIC-20 = Video Interface Computer-20. The 20 was a rounding down of the amount of memory in the VIC: 22K. Michael Tomczyk, who got stuck with the job of deciding on the name, did the rounding.

$03D 2048 bytes, or 2KB RAM. It is mapped at $0000-$07FF.

$03E BAM = Block Allocation Map, or Block Availability Map. I am checking sources to figure out which one is the real McCoy.

$03F ROR (ROtate Right) was not available until after June, 1976. However, all Commodore VICs and C64s should have this instruction. Some people gave instructions that are found on the 65C02, designed by Western Design Center, and licensed to many companies. However, the 65C02 itself occurs in two flavors, and neither are used in any stock Commodore product I know of.

MOVING?

Don't forget to let Commodore World know. Call or write with your change of address 6 to 8 weeks prior to your move so that you won't miss a single issue!

Mad Man Software

CKit 94!

It's Cool

CKit 94 is a powerful collection of backup utilities designed to take advantage of the expanded Commodore systems of the 90's. In fact the CKit is so advanced, we recommend it only for certain Commodore systems.

If You Have One Of These
Commodore 64, 64C, 128, or 128D
And One Of These
CMD RAMLink, PPI RAMDrive, or a 17XX REU with JiffyDOS
And At Least One Of These
Commodore 1541/1571/1581 or any CMD Storage Device
◆ YOU NEED THE CKIT 94! ◆

It's Mean

CKit 94 can view, select, and copy over 1,000 files! It can also copy entire 41/71/81 disks in ONE pass. It can even make the next copy directly from RAM. With the CKit you can squeeze over 700 files into an archive. Even more, you can squeeze your 41/71/81 disks and CMD partitions into backup files. All of this power is at your command through an easy to use menu driven interface.

File Utilities
Filemaster file copier and the Archiver file squeezer
Disk Utilities
Procopy disk copier and the 41/71/81/Native Boa disk squeezers
BBS Utilities
New Dissolver SDA maker and fast PD Decompers

It's Better

CKit 94 has 2 X faster and tighter compression than in previous versions. All of the utilities have been enhanced for power and speed. Plus, it has three new powerful utilities. And it takes full advantage of Commodore 128's and REU's. Wow!

Check Out The Support
✓ Commodore 1541/1571/1581 Drives
✓ CMD Hard Drives/Floppy Drives/RAMLinks
✓ PPI RAMDrives
✓ Commodore 128 VDC RAM Support (16K and 64K)
✓ Commodore 128 2MHz Enhanced Mode Support
✓ Commodore 17XX REU Support (up to 16Meg)
✓ RAMLink and RAMDrive DACC Support (up to 16Meg)

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SOFTWARE IN REVIEW

Keystone Software

Label Maker, Mail List Manager, Video Cassette Library, Home Inventory, CD/Record Library, Audio Cassette Library, Home Book Library, Stamp/Coin Collection, Photo/Slide Library, & Baseball Card Collection; Distributed by CPI; Select titles also available from CMD and SSI.

Keystone Software's specialized programs let you quickly begin keeping track of your mailing list, home inventory, books, music collection, video tapes and other items with similar, yet separate applications. These job-specific programs remove much of the drudgery involved in setting up a database, so that you can get right to the job at hand.

Once you've cataloged everything to disk, Keystone's Label Maker program helps you organize them by printing a wide variety of labels.

Label Maker

Of the ten Keystone programs I received for review, Label Maker v2.1 was the lone ranger—different from the other nine. Combining Label Maker with the Mail List Manager gives you an easy to use integrated system to print mailing labels (from 1 label across to 12 across), as well as for printing shipping labels, file folder labels, and numbered inventory tags. Label Maker also prints continuous form index cards, rotary index cards, VHS VCR labels, die-cut cassette labels (these are the WHOLE label on audio cassettes), name badges, shipping labels, 5.25" and 3.5" disk labels, and envelopes. And if these options don't suit your needs, you can create your own label layouts to use. Label designs which you create or customize can be saved for future use.

Designed to work with a wide variety of printers, Label Maker lets you embed printer commands to take advantage of special printer features such as italics, bolding, fonts, colors, and more.

Data for labels can be merged from other popular databases such as Superbase, Timeworks Data Manager, Fleet Filer, and word processors that save data in sequential file format with carriage returns.

Common Features

Keystone Software offers packages covering several common 'database' applications so that those of us who aren't comfortable with using a general database program could have an inexpensive and effective alternative. Anyone requiring more than one of the programs will quickly adapt to additional programs, since each are basically the same "core" program, with the fields and field names changed for the specific job.

A field is a line of text in a data base. Databases often have several fields to place different information so that you can later sort the information in these fields. For instance, the first field in the Mail List Manager is "First Name", and the second field is "Last Name". Once you've entered several names in, you can sort your list alphabetically by either the first or last name. The Home Book Library <tm> database has "Title" and "Author" for the first two fields. All of Keystone Software's data base programs offer nine fields, each of which can be used for alpha-numeric sorts. All but one have six pre-defined fields, based on the subject of the database, and three miscellaneous fields for custom use. Miscellaneous fields are not printed on the standard labels, but print on lists or rotary index cards. Some of the printing options are different, based on the purpose for each database. For instance, the Audio Cassette Library has options to print lists or die cut Cassette labels.

Keystone Software accommodates 128 users with 40 and 80 column versions, as well as a 64 version of each software package. The 64 versions hold 300 records while the 128 versions allow 1000 records. Either color or monochrome monitors can be used, there are no odd colors within the program to cause problems when using a monochrome monitor, and yet the color choices used are comfortable to the eye. A built-in screen blanker turns the screen grey after five minutes of inactivity, returning to the program screen when a key is touched.

The programs can be copied to any Commodore compatible disk or hard drive, and will load from any device number from 8 through 11, and allows dual drive numbers for each disk drive supported. Data lists can be stored on a different disk drive from the program drive. I file copied all of the database programs and List Maker to a Native mode partition on my FD-4000 drive, skipping any like-named files (mostly printer drivers) to test its compatibility with CMD devices, and found no incompatibilities with this arrangement. There was an added bonus, in that each of the different label types were accessible from any of the other programs, even if they weren't included with the original software package for the program loaded.

With this kind of disk drive compatibility built in, I was disappointed that the software doesn't display the number of blocks free on a disk drive when it displays the directory. It also doesn't allow the user to save the same filename for lists, reporting that the filename already exists, instead of scratching the old file and replacing the new one. DOS commands are allowed, so file scratching can be done manually, but that's time consuming. This approach of not replacing an existing file was probably taken due to the save-replace bugs in Commodore's original 1571 drive ROMs. Still, I prefer to save my work in progress frequently to avoid loss of data, and find saving under a new filename each time to be a quick solution, but that's also a lot of wasted disk space in the process.

Each of the database programs have a Drop Down Menu at the top of the screen, with the menu visible at all times, accessible with the F1 key. The cursor keys are used to move from menu to menu, the Return key selects a menu or menu item. To back out of the menu, the back arrow

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and/or ESC key are used. A Help Menu is visible at the bottom of the screen showing commonly used key commands (including the F1 key for the Drop Down Menu). Database records are between the two menus, with 15 records shown at a time. The field names are shown above each field. The cursor keys are used to move between individual records and fields. The screen scrolls to display fields that weren't previously visible when you cursor beyond visible records. The fields are individually highlighted when the cursor is on it, and can be enlarged or reduced in size for viewing.

Several "Quick" keys allow you to maneuver between record screens, such as the N key (for "Next") to move between "pages" of fields. "T" and "B" let you move to the Top or Bottom of the database instantly.

Data is entered in a quickly accessed submenu, and new records can be added without leaving the submenu. Insert and Capslock modes can be toggled on and off.

Actions are based on which record(s) are highlighted. Using the Drop Down menu, all records can be selected/deselected, or multiple records can be selected by cursoring to the field and pressing "S". Selected records can then be printed, deleted, or exported to disk. The ability to export files to disk allows databases to be divided or used with the Label Maker program. Any of the nine fields can be sorted, which makes it easier to group records for selection. A search function which allows wildcards makes it easy to find records. Both the search and sort routines are very fast.

Several printers are supported, and options are available to toggle linefeeds, true ASCII mode, as well as to change the secondary address sent to the printer. The Super Graphics Gold, and other Xetec interfaces are directly supported in the Select Printer menu. Unfortunately, parallel printing (geoCable) is not supported.

Multiple copies of the same record can be printed. Each database offers different types of "labels", with a standard 1 across label as the default. Printing can either be paused or aborted in process. As well as printing to a standard printer, the databases also allow you to "print" the records to disk in sequential file format for use in word processors or other programs.

The main differences in the documentation for each of the databases are related to the field names used based on the type of database. Some features aren't documented, such as the ability to print to a disk file; but these are easily understood within the context of the menu options given. Each software package includes a sample list to experiment with the program.

Mail List Manager

The Mail List Manager has extra information on U.S. postal regulations in the manual, and the regulations are adhered to for label printing. First and Last names are separate fields; two address field lines are given, the first for street or P.O. Box information, the second for apartment or suite information. One field is used for both City and State. The Zipcode field is large enough to include the new Zip+4 codes. A Country field allows the ability to use either U.S. or International addressing. Three miscellaneous fields allow for customizing for either sorts or for additional information such as phone numbers and or E-Mail addresses. The miscellaneous fields are not printed when the standard mailing labels are used, but print in other formats, such as the rotary index file format.

Home Inventory

The Home Inventory program allows you to list and keep track of your possessions for insurance purposes. The program could also be used for small businesses to track inventory. The defined fields are Item, From (for the name of the store or person the item was purchased from), Date, Where (for it's current location within the home), Model, and Serial number. The three miscellaneous fields can be used for information such as condition, and other notes.

Home Book Library

Includes Title, Author, Type (as in Fiction, Non-Fiction, etc.), Date, Publisher, and ISBN fields. The Title field allows a maximum of 28 characters. Standard labels or rotary index cards can be printed.

Video Cassette Library

Allows you to organize video tapes. A 4-digit Number field is used to keep track of your video tapes. Other fields are Title, Subject/Type, Counter (tape counter reference), Length, Rating, and Misc 1 thru 3. Standard or rotary index cards can be printed. The Video Cassette Library software does not print VHS Video labels, but is compatible with the Label Maker program to print detailed tape labels. Continuous form video tape labels can be ordered from Keystone Software.

Audio Cassette Library

Unlike the other databases, the Audio Cassette Library—as mentioned previously—prints entire cassette labels, not simply the bar style that normally accompanies cassette tapes. Continuous form die-cut labels can be ordered from Keystone Software. A 5-digit Tape Number field lets you track your cassettes. Other fields are Title, Artist, Subject/Type, Length, Counter, and Misc 1 thru 3.

CD/Record Library

The CD/Record Library doesn't include a Length field, but the information can be included in one of the three Misc fields. Like the Video and Audio cassette software, it has a field for Number, 4 digits in this case. The other fields are Title, Artist, Type (presumably for CD or Record, but can also be used for music style), Date, and Cost. The Audio Cassette Library software seems to offer more in the way of details often important to music lovers, and could perform the same functions for all three listening options by creative use of the Misc fields.

Stamp/Coin Collection

The Stamp/Coin Collection includes fields for Country, Denomination, Condition, Set, Number, and Value. Because of the similarities between coins and stamps, in terms of the kind of things usually cataloged about each, this is a dual purpose database. If someone collected both stamps and coins, one of the three Misc fields could be used to denote stamp or coin.

Photo/Slide Library

The Photo/Slide Library has five pre-defined fields and four Misc fields. For photographers it offers a means of keeping track of photos and information about the film and exposure settings used. The 5-digit Catalog # field functions the same as the previously mentioned Tape Number fields. Other fields are Subject, Date, Film (for type of film used), and Exposure.

Baseball Card Collection

As with so many of the other databases we've discussed, the Baseball Card Collection also provides a field for numbering cards. Other fields include Club, Player, Position, Cost (for how much you paid for the card), and Value. The Misc fields can be used to note condition and information to denote differences between duplicate cards.

Conclusion

Keystone Software's job specific databases are easy to use while offering flexibility too. Without a lot of complicated commands, it gives average users the tools needed for organizing data in a straightforward way. Combined with Label Maker v2.1, it becomes an integrated system for printing a variety of labels and cards. Although well written, the documentation is a little on the light side, but overall, the software has a great deal to offer.

- Gaelyne R. Moranec

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GAMES MINIVIEWS

Total Eclipse
Cinemaware
Available from CMD and SSI

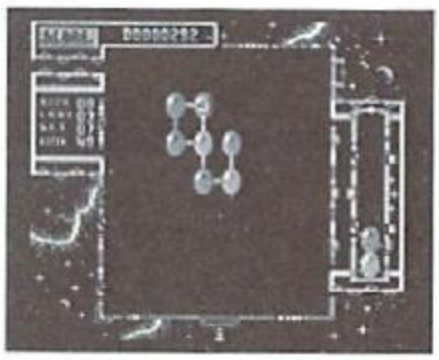
Total Eclipse is a role-playing adventure game in which you'll travel back to Cairo to the year 1930. You must break Ardognus, The Curse of the Sun God—the last remaining unfulfilled curse of Hahmid III. Ardognus promises to destroy civilization if anything dares come between the Shrine of Ra (the sun god) and the sun's rays.

As you, an adventuring archaeologist, glance through yesterday's newspaper a headline jumps from the front page; Total Eclipse of the Sun Due Over Cairo! You know the eclipse will prevent the sun's rays from reaching the Shrine of Ra. The last prophecy of Hahmid III is about to come true unless you find and destroy the shrine to prevent the execution of the curse. Besides there's a plus, who knows what treasures you'll find as you search the pyramid for the shrine? The game begins as you enter the pyramid.

The 3D action takes place inside a large scroll centered on your screen. A cross hare in the center of the scroll helps guide you through the pyramid. All your vital information appears beneath the scroll. A watch tracks the time; two hours remain until the completion of the eclipse. To the left of the watch, is your water bottle. Empty this and you'll die of thirst. Next to the water bottle is your beating heart. A heart attack can be prevented by monitoring your heart closely and resting when it races. Hopefully keeping you from getting lost a compass exists at the right of the screen. The current stage of the eclipse is indicated by the presence of a darkening sun at the top of the screen.

Total Eclipse's colorful graphics create a total 3D environment. At times the 3D experience tends to be a tad frustrating; the response time can be slow, making it seem to take a long time to move from one side of a room to the other. The ability to change your stride length is a handy feature for getting around in tight quarters. The pulsating musical soundtrack lends just the right amount of suspense to the game. The game's flexibility allows game control with either a joystick or the keyboard. You may even find yourself using both of them. One item that I'd highly recommended but which isn't packaged with the game is a giant helping of patience—you'll need it to save civilization from its impending destruction.

- Sherry Freedline



Atomino
Titus
Available from CMD

My first impression of Atomino's packaging was, "Wow, this game looks complicated!" But, if you know me, you know I love a challenge! I decided to be brave and jump right into the game without reading the manual. That was indeed a mistake. After playing through one round, I decided I definitely had to read the manual.

Well, let me tell you, the manual is a little complicated. Fortunately, I was able to decipher the manual and have become quite the Atomino Addict.

Atomino is a Tetris style game. Instead of the usual variety of shapes, the game pieces consist of atoms with varying amounts of "free combinations". The object of the game is to construct molecules and clear the board. As you well know, molecules are comprised of atoms. Thus, in Atomino you must build complete molecules. A molecule is only complete when its atoms no longer contain any "free combinations". Once a molecule is complete it is cleared from the board.

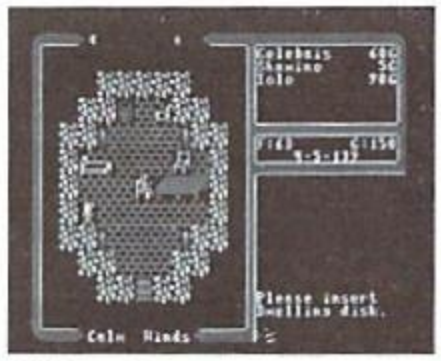
At first the term "free combination" confused me. Think of a "free combination" as a free arm. When two atoms meet, each with one free arm, they join hands and a complete molecule is formed because neither atom has a remaining free arm. They are then cleared from the board.

This sounds easy, but it's not. Atoms with varying amounts (from 1-4) of spinning free combinations fall into a pit on the right side of your screen. This pit can only hold up to 6 atoms at one time. If a seventh atom falls into the pit the game is over. And, of course, the longer you play and the higher the level, the faster the atoms fall!

Atomino provides two different game modes known simply as modes A and B which provide almost endless challenges. In Mode A games the computer assigns the number of molecules to be constructed and the number of atoms required to construct each molecule and even obstacle courses for their construction. In Mode B games the goal is much simpler - construct as many molecules as fast as you can to rack up a high score.

I could easily go on and on with this review—about the colors (two sets on the C64), about the music (wow!), and more, but space just doesn't permit. To sum it all up, if you love Tetris you'll definitely love Atomino—maybe even more than Tetris!

- Sherry Freedline



Ultima V
Origin Systems, Inc.
Available from CMD

Ultima V is an adventure role-playing game from Origin Systems, Inc. I seriously doubt the existence of an adventure game addict that has not heard of the Ultima series of games.

The moment I held Ultima V in my hands I knew it was worth every second of its long awaited arrival. Of course my expectations were high. Once I ripped it open, I was not in the least bit disappointed. Inside I found a cloth map of the city you'll come to know better than the back of your hand: Britannia. There was also a Player Reference Guide, a Quick Reference Guide, a copy of

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his Majesty Lord British's Journal (detailing the last attempt to recover Britannia), and the very impressive looking Book of Lore. All of these are printed on an excellent heavy stock paper. The last item—a replica of the game's infamous amulet—may seem a bit trivial, but it does help in creating the "Ultima Atmosphere".

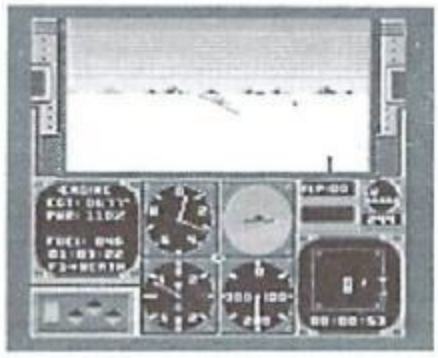
Ultima V is loaded with features. Adventure from a Commodore 64 or a 128 in 40 column mode. Players selecting 128 mode are treated to 15 musical compositions, while players in 64 mode are treated to a faster loading time. The game can even be played from two disk drives, cutting down on the required disk swapping. And for fans of past Ultima games, your hero from Ultima IV may be transferred to Ultima V.

Before beginning your this Ultima adventure, be sure to view the introduction in its entirety. Not only does it contain great graphics, but it also provides you with some vital background information for a better understanding of your quest.

Your quest begins after you've been summoned back to your beloved land of Britannia by two long time friends. Britannia has fallen prey to the evil rein of a ruler who's mind is controlled by the unspeakably horrid but unknown creatures of the underworld. With the aid of your friends, Shamino and Iolo, you must venture into Britannia's dark underworld to uncover the fate of Britannia's rightful ruler, Lord British. The rein of Britannia must be restored to Lord British! The fate of Britannia is in your hands! And the adventure begins!

Some will say Ultima V is excellent, outstanding, or even a superior game. But, "quality" sums these up in one word and includes one more important feature possessed by Ultima: CLASS. From top to bottom, Ultima V is indeed a quality product. Wow, after reviewing my article, you may think I've been paid off to give Ultima V such a fantastic review. Well, the facts pretty much speak for themselves. If you'd like to judge for yourself, there's only one way: play Ultima V—I'm positive you won't regret it.

- Sherry Freedline



AcroJet

Microprose

Available from CMD & SSI

The folks at Micropose have given me my very own personal jet! Of course it's disguised as a 5 1/4" floppy disk and its control panel looks remarkably like the keyboard of my beloved Commodore computer. You, too, can experience the thrill of flying the BD5-Jone-man jet aircraft with AcroJet from Micropose!

If this is your first flight, then the first thing you may want to look into before even loading Acrojet is how to construct a seat belt for your computer chair. Reading the manual should be next on your agenda. I found it useful to jot down the take-off and landing steps on an index card. It's much easier to glance at the index card than to try to quickly skim through the manual for help in those last remaining seconds before that unavoidable crash. It's also important to make yourself familiar with the various items in AcroJet's cockpit layout. A complete diagram is provided in the manual.

Before you can experience the excitement of your first flight, you'll have to make a few decisions. First off, you'll need to choose a flight plan. The flight plan may consist of one single event, a pentathlon, a decathlon, or create your very own unlimited events. AcroJet provides ten different acrobatic events which range in their degree of difficulty.

Next you will have the opportunity to choose the difficulty of the game by altering the wind conditions and the speed of your jet. A last option allows you to select between being airborne or grounded. Choosing airborne means you won't have to take-off or land your jet.

Buckle up, because you're now ready to attempt your first take-off! Warm up your engine, set the flaps for "half flaps", maximize your throttle, release the gear brakes, pull back on the joystick just a TAD, and it's up, up, and away! Sounds easy, right? Well, I'm too embarrassed to admit how many crashes I had before I finally managed to get my jet in the air. Once you are in the air you can perform your chosen event(s).

AcroJet is a fun simulator. The sound effects and graphics make you feel as if you are truly in the air in your very own jet. The manual tells you more than everything you'll need to know to get your feet off the ground. I found this game very hard to put down—hopefully this review isn't too late. It's a good thing I have a very understanding editor!

- Sherry Freedline

Superman: The Man of Steel

First Star Software

Available from SSI

For as long as I can remember, Superman has been around in various media formats. We've enjoyed his adventures in cartoons, movies, and comic books. And now, with Superman: The Man of Steel, we can enjoy him via our Commodore 64's.

First Star Software's Superman adventure is laid out in the style of a comic book. A quick press of your joystick button advances you from frame to frame. At the end of each page you are whisked away into an arcade style game. Each of the six dilemmas consist of a problem that only Superman can solve with the help of his Super-Powers of flight, heat vision, super strength, telescopic vision, and super breath (maybe we should give up mouthwash?).

The plot revolves around the evil union between two of Superman's most sinister foes. As a result of this alliance, the earth has been blitzed with earthquakes, gushing volcanoes, and even mammoth asteroid storms which threaten the existence of The S.T.A.R. Lab Space Satellite. Superman has only a few remaining hours in which to save the earth from it's imminent destruction.

During each of the six arcade games an "icon bank" provides a selection of the above mentioned Super Powers. Not all of these powers are available in each scenario. An energy level indicator furnishes a constant reminder of Superman's remaining strength. Simply refrain from using Superman's powers in order to restore his strength.

Complete the game within the allotted time frame to receive a bonus score. Bonuses may also be earned by fighting, beating, and destroying various objects and hazards within a period of time or over a measured distance.

All-in-all, Superman is a fun game. The graphics are above average and the game isn't so difficult that it becomes frustrating. However, one item bothered me a lot, enough to prevent me from becoming addicted to this game: Superman is shipped on 2 double-sided disks. To load various levels the game requires frequent disk access. I felt disk access far surpassed playing time. But, if you are a patient type of person, you'll be rewarded with a very entertaining Superman adventure.

- Sherry Freedline

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HARDWARE IN REVIEW

Big-D Kits: Make Your 128D More Convenient

BIG-D Kits

Available from: L.L. Pankey, 1712 Santa Margarita Dr., Fallbrook, CA 92028-1641.

I have been the proud owner of a Commodore 128D for about 5 years, and ever since I purchased a second drive I have dreamed of having the ability to change the device number on the internal 1571. But without proper guidance I was unwilling to undertake the task. That's why I fired off a letter to L.L. Pankey when I saw his ad in dieHard. In about a week I received a flyer that described the three kits being offered for sale.

The Kits

There are 3 BIG-D kits. Kit #1 will change the device number of the internal drive to 8 or 9 and allow drive and computer resets from the front panel. Kit #2 will change the device number to 8, 9, 10, or 11 and the same resets as kit #1. Kit #3 moves the power switch to the front panel.

I ordered kit #2. The kit arrived very promptly, within a week, probably due in part to the fact that I had paid via a postal money order. The kit was contained within a small padded envelope and consisted of a zipper bag with the wiring harness, switches, and gummed labels and a 8 page set of instructions. The switches and pushbuttons are wired to a neatly tied wire harness of pre-cut and tinned wires.

The Instructions

The installation involves disassembling the computer, drilling holes in the plastic front panel, installing the switches, soldering the wires in place and finally reassembly and test of the computer. The instructions are very thorough and include excellent diagrams.

I read the instructions over several times to convince myself that I could do the soldering. This is the most hazardous operation in the installation procedure and the instructions contain several warnings about it The fact that three of the five wires were to be soldered directly to IC pins sent a bit of a chill down my spine but I decided to try anyway.

If you are faint of heart the instructions advise you to find a friend or a Commodore repair shop to do the soldering. The remainder of the installation is well within the capabilities of the average person and the instructions are of the very detailed step-by-step type and contain warnings about electrostatic discharge and other problems to avoid.

Disassembly and Drilling

I started the installation with the disassembly, removing the cover and the disk drive, which went without a hitch. I removed the front panel and marked it in accordance with the measurements on the diagram. I drilled the holes with a standard electric drill and started to install the switches when I encountered my first problem: a loose wire.

A short black wire that connects the two device selection switches together had broken loose at one end. It appeared that the wire had not been soldered very well and broke loose as I handled it. Luckily it was pretty obvious where the wire had come from but a wiring diagram of the harness and switch configuration should be provided so that problems like this can be corrected without having to return the kit.

The switches went in easily. One note about placement of the switches. It is important to measure and locate the switches in accordance with the diagram. The front panel has a series of ribs on the back side that would interfere with the installation if the switches are placed incorrectly.

Also, I had previously installed JiffyDOS, with the switch on the front panel, and by sheer dumb luck I had located the JD switch well out of the way of the four BIG-D switches. If you are considering a joint BIG-D/JiffyDOS installation the JD switch should be located to the left end of the front panel (near the power light) to avoid interference.

Soldering

Soldering the five wires of the harness was very easy, my biggest fear was over heating the IC (IC#106) when placing the three wires required. I wanted to use an alligator clip as a heat sink but there was not enough room to attach it to the pins. The technique I used was to place a blob of solder on the tip of my iron (45W) and touch it to the wire and pin for just a second and that seemed to work just fine. The other two wires, for the drive and computer reset buttons, are attached to resistors near the rear right-hand corner of the mother board.

Reassembly and Test

I reassembled the computer and fixed the labels to the front panel. The labels identify the push buttons by function and how to flip the switches for the four device numbers allowed. The switches consist of two push buttons and two toggle switches.

The left hand push button is the computer reset button, the two toggles are in the middle and provide the device selection for the internal drive and the right hand push button is the drive reset button. I powered up the computer and tested all the device selections and the reset buttons and it all worked flawlessly.

Recommendations

The $25 (shipping included) price tag was, in my mind, cheap insurance that I would get it right and that most of the pit falls would be avoided. Kits #1 and #3 are $21 and $10 respectively. The whole project took about 3 hours (but half of that was spent looking for tools!). I have installed JiffyDOS in the same computer and this project was harder, simply because of the soldering involved, but requires about the same level of skill.

This kit is obviously not for the experience hardware hacker. But for the 128D owner who doesn't have the experience, or friends with experience, I highly recommend this project so you won't have to go it alone on a hardware project like this. In fact this project has boosted my confidence and I intend to try more hardware projects in the near future.

- Tony Perotti

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HARD TIPS

INSTALLING DEVICE NUMBER SWITCHES ON THE COMMODORE 128-D

Greetings hardware hackers! This is SMS MIKE (Mike Eglestone), SysOp of DiamondBack BBS. The topic for today (by request from my many dieHard Readers) is the installation of external device switches on the front panel of the C128-D.

Before we get started, some advice from the expert: If you can't solder small connections, in tight areas on a circuit board, this is not a modification you want to attempt. Get someone else to do it for you or take this article (and your 128-D) to a computer dealer/repair center.

You 128-D owners know that the built in 1571 drive answers to device (8) at power-up. Up to now, you had to "Software Switch" the device number to use any other drive you might have available as device (8). Real pain in the, er, butt, and that's putting it mildly!

Those days are gone folks. Here's the procedure for installing external device switches on the front panel of the 128-D case.

Parts required for this job:

- 25 to 40 watt soldering pencil
- High grade electronic solder (fine)
- Two, Micro mini switches SPST (on/off) (Radio Shack)
- Approximately 30 inches of very fine stranded electronics wire.
- A drill and drill bit to install the switches on the front panel.

First, remove the case cover from the main unit. Three screws in the back, and two smaller ones on the bottom front of each side. Slide the case cover back about 1/2 inch, and pull the front straight UP. The cover will turn loose of the bottom with ease.

Next, remove the built in 1571 drive unit. Don't let this throw you, it's very simple and easy to do. Disconnect the Rear (read/write) head connection, then unplug the three power plugs. HINT: Note the color of the wire on the FRONT of each plug. This will let you relocate them in the proper position when it comes time to plug them back in. It's darn near idiot proof, but I have screwed it up myself.

Remove the screws on the SIDE of the drive. Some have three, and some have four. Pull off the latch lever from the front, and slide the unit out of the mount. Set it aside for now.

Under the drive, Front Facing Rear, on the left hand side, you will notice a chip called (65C22 or 609-0371923) This is the device number control unit, among other things. Directly behind that chip, you will see a Crystal can. A metal can with a piece of wire wrapped around it which is soldered to the circuit board. Keep this "can" in mind, we will use it later...

On the left REAR side of the 65C22 chip, you will notice two small silver dots, just to the left of the 4th and 5th pins (counting rear to front).

These small silver dots are on the circuit board, and are really two half moon shaped dots with a very small connection between the half moon sections.. Look very close, and use a magnifying glass if necessary. These are the pads we will be dealing with when we add the device number switches.

Take a very sharp Exacto knife, or a razor blade, and scrape the small trace between the pads off the circuit board, the drive will now answer to device (11). Both circuits are now open, and the device number is (11). Those pads are nothing more than Circuit grounding points. The side closest to the chip is the switch side, and the other side is a circuit ground. The trace in the middle makes the connection.

The next step is to install a wire to the chip side of the pad half.

Using very fine stranded wire, about 10 inches long, strip back about 1/4 inch of plastic cover. Using a 25 to 40 watt soldering pencil, pre-tin the end (melt some solder into the wires and make it stiff).

When the wire has cooled, bend the pre-tinned end to a 90 degree angle in the middle of the tinned area. This will give you 1/2 inch up and 1/8 inch on a 90 degree angle.

Don't try to place solder directly on the circuit board pad. Use the solder on your pre-tinned wire only. Using care, position the 90 degree angle on top of the pad, and apply heat to the wire with the soldering pencil while pressing down. When the solder flows, remove the heat and hold the wire very steady until it cools down. Do exactly the same thing to the other pad.

You MAY drill a very small hole (#50 drill bit) in the pad half and insert the wire 1/8 inch into that hole and then solder the connection, but it's not necessary if you're careful. This is NOT a structural connection, and care must be taken at all times. If you mess up, and overheat the small pad half, it will separate from the circuit board and come OFF. If this happens, the pins on the chip itself must be used, and they are on the Opposite Side of the chip. Rear counting towards the front, pins 5 and 6 on the Right hand side can be used as direct connections.. (Check them with a VOM to make sure first).

All right, let's assume you made it, and you have the two wires attached to the pad halves properly. Next, you remove the front plastic panel on the case itself. Three screws at the top, spaced about evenly across. Tilt the panel slightly forward and slide it up and out.

Drill two holes just left of the drive activity light, and slightly lower. Watch your clearance between the switches, but mount them side by side with minimum spacing between them. The switches should be mounted so that UP is ON and DOWN is OFF .

Using the large hole to the left of the drive mount, feed both your wires through and out the front. Connect/solder the front pad wire to the upper connection on the LEFT switch, and the rear pad wire to the upper connection on the RIGHT switch. Using the Third 10 inch piece of wire, bridge the lower connections between both switches. Strip back about an inch of plastic cover, solder both lower connections to this single wire. This is your circuit ground, and is common to both switches.

Next, feed your third wire back through the large hole, and solder the other end to the " Silver Can" mounting strap. Remember I told you to keep this "Can" in mind. It's a perfect circuit ground point.

Okay, that's the end of the job. Reinstall the front panel and the drive unit. You may test this setup with the case cover removed. It will work out like this. Both switches UP, drive is device 8. Left switch down, device 9, Left up, Right down, device 10, both down, device 11. Just don't forget that you MUST reset the drive or the computer after each switch movement.

The drive has a separate reset switch right next to the Computer reset switch on the right hand side towards the rear. I opened up the hole for this drive reset switch, and put a plastic extension on the button. Those little vacuum caps that are sold in most automotive stores make perfect extensions for the reset switches.

Questions, Comments, Panic? I can be reached at 305-257-5700 at most any time during the afternoon, and my BBS (DiamondBack) is 305-258-5039.

- Mike Eglestone (SMS MIKE)

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Graphic Interpretation

by Steve Vander Ark

GEOS: PRODUCTIVE, USEFUL, AND STILL FUN!

I was sitting around the other day, plugging through a stack of old GEOS disks, and pondering things. I wasn't looking for anything in particular; I just go though disks every so often because there's so much there that I never really looked at before, stuff I downloaded once upon a time and socked away and forgot about. So while I was zapping though all these files, my mind wandered a little and I started to think about "The Meaning Of It All". Well, the "Meaning Of GEOS" anyway.

Why do I use GEOS on a Commodore 128 anyway? I've heard plenty of arguments against it. I read all those Mac and IBM catalogs full of miracles that I can't afford with desktop video and multimedia. And to be honest with you, along with my Commodore I use a Mac, an IBM-compatible, and a hand-held Newton. But I still love the Commodore. Why?

I'm not alone, either. There are thousands of people still blissfully using a Commodore computer every day. Non-Commodore users might be totally sold on their particular machine, but an awful lot of them will tell you with a wistful sigh that, oh yes, they started out on the 64 and, boy, that was a great machine. For example, the other day in the Newton RoundTable on GEnie, a place heavily infested with Mac users, I and several of my fellow Newton users spent ten or fifteen minutes extolling the virtues of the Commodore.

I'm not just a Commodore fan, of course. I'm a GEOS fan. A really *big* GEOS fan. I run my Commodore in one of two modes: game mode and GEOS. Sometimes I even put the two together: some of my favorite games are GEOS games like

geoTiles. Sure, I know how to run Windows. Yep, I can zip around a Mac like nobody's business. And that little hand-held job I have is really cool, sort of like Star Trek come to life. But I just love GEOS on my 128.

So what's the deal? What keeps me coming back to a "lowly" 8-bit operating system? I think the answer is simple: it's fun. I suppose that sounds trite, but I'm serious. Let me give you some examples of what I mean.

First of all, GEOS is fun to use. It's fun to zip around with a mouse, clicking on menus and buttons and making things happen. This is especially true if you are familiar enough with operating in "naked" mode (in other words, using the typed-in commands... the other way can be fun, too, I suppose...). With GEOS you can do just about anything you want to do without having to remember any of those cryptic code phrases or worry about typing one stupid little character wrong. It is wonderfully liberating. That makes it fun.

Secondly, GEOS is fun to see running. All those neat icons and windows opening and closing and menus dropping down are really cool. I suppose that's why I still have a fondness for the deskTop, with its icons and page-turning metaphor. I actually use gateWay and DualTop quite a bit, but when I do I really miss the look and feel of the good old original deskTop. I admit it: I *like* icons. On top of that, GEOS operates in high-resolution mode, which means it looks clean and professional, even with its cute icons. That also means that graphics for things like games are always impressive.

Third, GEOS does everything. No, let me rephrase that. GEOS does more everything, more than anyone thought possible. Let's face it, GEOS has taken the Commodore computer to new levels of power and sophistication. Here's an example of what I mean. Before GEOS, there was no full-featured desktop publishing software for the Commodore; in fact, everyone figured you had to use a Macintosh for that. GeoPublish, however, really proved that the Commodore could be used for serious publishing work. And once you consider the price, GEOS will do it for a heck of a lot less money. GEOS gives the Commodore the power of integration as well, and that's a very powerful thing indeed. Today's computers run Windows or System 7 more than anything for the power of integration. Everything works the same, everything works together, and as a result everything works a lot better. GEOS gives the

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"WHAT KEEPS ME COMING BACK TO A LOWLY 8-BIT OPERATING SYSTEM? I THINK THE ANSWER IS SIMPLE: IT'S FUN."

Commodore user the ability to move effortlessly between the word processor and spreadsheet, the paint program and the desktop publishing program, moving text and graphics from one to the other. Even such unusual functions as running digitizers and playing SID music are accessible within GEOS. This kind of powerful computing is exciting and, yes, a lot of fun.

Along those same lines, it's just plain fun to show up the nay-sayers once in a while. I remember one year digitizing images of a bunch of school kids and then letting them use geoPaint to mess around with their pictures, adding mustaches and word balloons and who know what. Another teacher saw what the kids were doing and asked what computer I was using. Heh heh heh. You should have seen the look on his face. Especially when I told him what I paid for the whole setup. Fun? You bet.

Well, I had nearly reached the bottom of my stack of disks, paging through icons in the deskTop and having a ball. I had pretty much reached the end of my philosophical ramblings as well. But I couldn't help but think, once again, about how much potential there still is in the GEOS system. With memory devices like the RAMLink available, programs can be written to do even more amazing things. What about a document-oriented application, one which lets you call in tools like word processors or spreadsheets as overlays to work on a document which never leaves the work space? What about a fax program? What about an authoring system like HyperCard that lets you create your own graphic presentations complete with music and even animations? All of this is possible in GEOS, and we don't need to buy three thousand bucks worth of high-falutin' equipment and hundreds more in software to do it with. What it will take is programmers with imagination and vision and, most importantly, a sense of the *fun* of GEOS.

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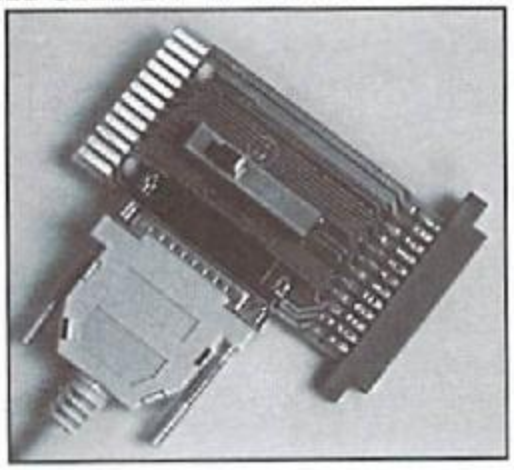

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GEO PROGRAMIST

by Maurice Randall

DISPLAY MODES PART 2: 40-COLUMN, 80-COLUMN, OR BOTH?

Creating a program to operate in both 40- and 80-column modes can sometimes be a challenge. One of the things that is often overlooked is 'testing'—chances are good that you'll be releasing this program to the public in some way, whether it be commercial, shareware, or public domain. Why else would you need a program to run in both modes? It's important to test all aspects of the program in both modes. You'll get it working good on your 128 and not realize that something isn't quite right when run on a 64.

The main thing to be concerned about first of all is screen appearance. Other differences between the 64 and 128 won't matter as long as we stick to using the resources that are available with GEOS 64.

As stated in the last issue, the high bit of most any X coordinate is used as a doubling bit with GEOS 128. But this feature is not available with GEOS 64. So, we can't use it. Or can we?

Check The Mode

What we have to do is write a *self-modifying* program. When our program starts, one of the first things that must be done is to identify the type of computer that is being used. If it's a 64, we simply continue on with the program as is. This is because 40-column mode is assumed to be the default and we should write our program with all of the X coordinates as such.

If the machine is a 128, we must now check to see which mode is being used. GEOS 128 provides a variable called **graphicsMode**. Check this location; if a zero byte is found, the program is running in 40-column mode. If graphicsMode contains $80, then assume 80-column mode. The graphicsMode location also exists in GEOS 64; however, there's no guarantee that you'll find valid data at that location in GEOS 64. For those of you who don't have the correct definition of graphicsMode, be sure to add it to page 12 of your geosSym file as follows:

```
graphicsMode=$003f
```

The following routine will set a variable called **screenMode**. We can use this variable at any time during the running of our program to test the mode we're running in.

```
TestMode:
 jsr InitForIO        ;pop out of GEOS
 lda $fffd
 cmp #$fc             ;all 64's contain #$fc
                      ;here.
 beq 20$              ;branch if 64.
 bit graphicsMode     ;check if 80 columns.
 bpl 20$              ;branch if 40.
 lda #$80             ;set bit 7...
 .byte $2c
20$
 lda #$00             ;or clear bit 7...
 sta screenMode
 jmp DoneWithIO       ;get back into GEOS.

screenMode:
 .block 1
```

This routine could have also set another variable that would identify whether the machine was a 64 or 128. For now, we only need to know if the computer is in 40- or 80-column mode.

If the program is running on a 128 in 40-column mode, we have two choices: leave everything the way it is and continue on (since the program is written for 40-column mode); or proceed with the doubling bit modification. The only reason to perform the modification would be if our program allows switching between 40- and 80-column modes. If the computer is in 80-column mode, then we would definitely do the modification.

Locating With Labels

Within our source code, we can define a location with a label. It is then a simple matter of modifying the byte found at that location by making reference to its label. If we need to change a byte within an icon table, we just put a label in front of the desired byte. If it's a two-byte word that needs to be altered, the label should go in front of the pair of bytes and we'll reference it as **label+1** since we're referencing the high byte.

To modify each of the locations now, we need to create a table that will hold the address locations of these labels. Let's assume that we have three locations that need to be changed: **label1**, **label2**, and **label3**. We can store the high and low byte of the locations in two tables with:

```
LowTable:
 .byte [label1,[label2+1,[label3
HighTable:
 .byte ]label1,]label2+1,]label3
```

Let's say that one of these, **label2**, is a two-byte location and the other two are single byte; hence the reason for **label2+1** in the tables. The following code will perform the modification for us:

```
 ldx #0
 ldy #0
10$
 lda LowTable,x       ;set r0
 sta r0L              ;to point to
 lda HighTable,x      ;a label.
 sta r0H
 lda (r0),y           ;get the value.
 ora #$80             ;set the high bit.
 sta (r0),y           ;and store it.
 inx                  ;point to the next.
 cpx #3               ;have we done all 3?
 bne 10$              ;branch if not.
```

This is a simple example—chances are that you'll have more locations than this to alter. As you develop your program, just keep adding or deleting labels at the various locations and the reference to them in your tables.

So Much For Organization

This system works fine most of the time. If you are an organized programmer and use global and local labels within each of your routines, you

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might encounter problems. A routine should always begin with a global label. Within the routine there can be local labels that may only be referenced from within that routine. If you should stick a label inside that routine to identify a byte that needs to be modified, geoAssembler will treat this as a global label and you might make your local labels within that routine useless. Local labels are normally used for branching within a routine. It isn't good programming practice to branch outside of a routine; however, geoAssembler does allow us to branch outside of a global label, and so in this case you will have to change the local labels within these routines to global labels. Just don't forget the reason for doing so. Make a note at the start of the routine about what is taking place on that particular page; otherwise, you're likely to forget.

Do It On The Fly

Another method you could employ is to alter a location as it is used. This would eliminate the need to mark a location with a label. Early on in our program, we would set a variable that we will use to 'or' with the accumulator. Let's call this variable 'screenMode'. If we're in 80-column mode, screenMode will have it's high bit set. Let's say that we want to draw a vertical line right down the middle of the screen. Here's how this would go:

```
DrawVertical:
 LoadB r3L #0       ;top of screen
 LoadB r3H #199     ;bottom of scree
 lda #[160          ;halfway across
 sta r4L            ;low byte.
 lda #]160          ;high byte...
 ora screenMode     ;fix the high bit.
 sta r4H
 lda #255           ;pattern byte.
 jmp VerticalLine
```

As you can see, this type of coding might be a little simpler to work with. For changing a byte within a table, however, we'll still have to use a label. But there is no chance of goofing up our global and local labels within a table of bytes using this method.

Use Exact Values

There is yet another method we can use to alter our horizontal coordinate values within a program. We can do something similar to what we have already talked about here, only instead of setting the high bit, we could place the exact value that is needed. In the previous vertical line example, r4 will end up holding a value of 160 or in hex, $00a0, for 40-column mode and $80a0 for 80-column mode. We could just as easily test for 80-column mode, and if so, load r4 with 320. This would be the exact value needed to draw a vertical line halfway across the screen.

There are times when we have no choice but to use exact values. One of them is when we are using menus. The system font is different for each mode and as such menu widths will be different. The way around this one is to have two completely different menu tables. Just point GEOS towards the one you need to use before calling DoMenu.

If you are planning a major application, you might just want to forget all of this and make two separate versions. You could then take advantage of the 128's screen resolution as well as some other features that the 64 is lacking. However, for most moderately sized applications, you can see that it really isn't that difficult to work with both modes in the same program.

40/80 FLAG

One important thing to remember when creating any kind of GEOS file is to put the correct value into the 40/80 flag. This flag is located at byte #96 within the header block of all GEOS files.

Choose from one of the following values depending on the machine and/or mode you intend to target your program for:

$00 - 40 column only (64 or 128)
$20 - 128 40 column
$40 - all modes
$60 - 128 only (40 or 80)
$80 - 64 only
$c0 - 128 80 column

A user interface such as the Desktop or any alternative can check this byte to see if your program is compatible with the current mode before loading it.

The 64 Desktop does not check the 40/80 flag. It was written when there was only one mode to run in. The 128 Desktop, however, does check this flag. Any alternative desktop should also check it. Even if your file is not an application, it might be a specialized file such as a printer driver that will only work on a certain machine. An application should check this flag before loading your printer driver.

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BASIC INSTINCTS

STARSHIP COMBAT PART V: THE FINAL INSTALLMENT!

REPAIRS - NOW UNION AND ALLIANCE SHIPS CAN REPAIR DAMAGE
IDEAS - COOL IDEAS FOR PROGRAMMERS OF ALL LEVELS
OVERVIEW - A QUICK LOOK AT THE STARSHIP COMBAT CODE

by Gene Barker

IMPORTANT: *Please see the notes on entering this program located just before the listing before you actually start typing the listing into your computer.*

Newcomers

This is the fifth installment of a large science fiction strategy game written in Commodore BASIC. In the process, we're sharpening our BASIC programming skills. If you'd like to follow along, you'll need the first four installments, which appear in Commodore World Issues 2 through 5.

About Installment Five

Wow! Are we already on the last installment? Yes we are. In this installment we finish Starship Combat by enabling the repairs option for the Union and creating a general repair routine for the Alliance. Then we look at a couple of interesting ideas and projects for the programmer. To conclude the column, we examine the general flow of the Starship Combat code. Onward...

Union Repairs

Now that the Alliance can blast away at your Union ships, you need a way to repair those battle-torn survivors. In the first installment of Starship Combat, we placed the "(r)repair" option in the main menu. We activate the repair option like we did the others, by changing the ON GOTO statement in line 20110 to jump to 23000 when the repair option is selected (the sixth number after GOTO). The repair option has its own menu (please see Repair Options).

REPAIR OPTIONS

Line	Option	MP's	Power	Description
23200	Generate Power	1-7	NONE	Adds 15 points to Power per MP available
23300	Patch Hull	1-7	MP x 5	Adds 5 points to Superstructure per MP available
23400	Restore Shields	1-7	MP x 2	Adds 10 points to Shields per MP available
23500	Build Torpedo	3	25	Adds a torpedo to your current stockpile

You may be surprised at how small the repair routines are. These routines manipulate the numbers found in the Active Ship List array SL%. They also check the Ship Type array TY%, to make sure that a repair does not exceed the ship's limits (such as giving a ship more torpedoes than it can carry). To trace the use of these arrays, refer to the Active Ship List and Ship Type charts from installment two.

Alliance Repairs

To be fair, we have enabled repairs for the Alliance as well. These changes can be found at lines 26100 to 26199. In these lines we calculate three new values:

F4 - % of maximum energy units
F5 - % of maximum shield strength
F6 - % of maximum superstructure

Using these values the code identifies the best repair option and executes it. Fortunately, we setup the Union repair routines so that they may be used for Alliance ships as well. You will also notice that the Alliance cruisers can use both Generators and Shield Kits (using the Union's routines for these items located at lines 22400 and 22200 respectively).

End Of Code

After making this installment's changes (please see the Starship Combat program listing), you will have a fully functional science fiction strategy game. This concludes Starship Combat. But maybe we can do a little more. Read on...

Ideas And Projects

Can you make Starship Combat a better game? This is the fun part of programming; where we take an existing program and customize it to our liking. Yeah! Below you will find a list of ideas and projects for beginner, intermediate, advanced, and turbo geek programmers.

Beginner

1. Can you make the Alliance a more challenging opponent? (Hint: Change the data statements for the Alliance ships in the Initialize Game Variables section at 10400. Be sure to use the Ship Type Chart from installment two as a guide.)
2. Can you change the movement keys (@,:,;,/) to the cursor keys? (Hint: Change the data statements for the Option Characters in the section at 10950. Don't forget to change the print statement in the main menu at line 20040.)

Intermediate

1. Can you add another challenging scenario to Starship Combat? (Hint: Review the Scenarios section found in installment two. Draw out your scenarios on paper before typing them in.)
2. Can you make the Alliance smarter? Hint: Try placing a new check so that the Alliance ships won't uncloak until they have even or better odds. Try having the Alliance ships hunt down stragglers in the Union fleet.
3. Can you change the Status window so that it reports the percentage of Power, Shields, and Superstructure left? Hint: You'll have to use both the Active Ship list array SL% and the Ship Type array TY%.

Advanced

1. Can you add another computer-controlled opponent? (Hint: Keep it simple. Perhaps create a pirate type opponent where the number of pirates remaining has no effect on the outcome of the game. Also, try to use as many of the existing routines as possible, such as the Union movement routines).

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2. Can you add a new type of weapon, such as a null field? (Hint: Add the new weapon to the item list. Try a weapon that effects an opponent's shields or movement points. Don't forget to equip the Alliance with a similar weapon. Fair is fair.)

Turbo Geek

1. Can you add sound for movement, phasers, disruptors, torpedoes, cloaking devices, and explosions?
2. Can you change the sector map so that it uses sprites or perhaps even a bitmap for better graphics?
3. Can you outfit Starship Combat so that it can be a game on a BBS (where the user is the Union and the BBS is the Alliance)? This is actually easier than you may think.

Overview

Section	Type	Description
100 -599	Main	The main program loop: This section cycles through the Active Ship list SL% allowing the ship with the most movement points to move first. The section will cycle through this list until all the Union or Alliance ships are destroyed.
10000 -10199	Subroutine	Initialize the game screen: This section draws the main game screen, including setting the screen colors and selecting the lowercase character set.
10200 -10299	Subroutine	Print repeated character string: XS$ - character string XS - number of repetitions This routine will print the string XS$ XS times.
10400 -10999	Subroutine	Initialize game variables: This routine is called once at the beginning of each game. Sets up the Ship Type array TY%, Item List array IT$, Phaser array PH%, Torpedo array TP%, some string variables, scenario, Active Ship list array SL%, Option character array OPS, and the POP for our GOSUB statements.
11000 -11099	Subroutine	Initialize ships for the next round: This routine is called at the beginning of each round in the main program loop. It initializes the number of movement points and regenerates 10% of the shields for each ship. These changes are done through the Active Ship list array SL%.
11200 -11299	Subroutine	Clear notes area and set the cursor: This routine will prepare the notes area on the game screen so that the next print statement will be placed perfectly in the upper left hand corner of the area.
11300 -11399	Subroutine	Clear options area and set the cursor: This routine will prepare the options area on the game screen so that the next print statement will be placed perfectly in the upper left hand corner of the area.
11400 -11599	Subroutine	Update the status and map areas for the current ship: SH - the ship in the Active Ship list array SL% UP - the update mode 0 - no update at all 1 - complete update stats and map 2 - update map area only This routine will update the status and map areas for ship SH according to the current update mode UP.
11700 -11799	Subroutine	Handy print integer routine: XN - the integer XL - maximum length of the integer in ch's Will print the integer padded with spaces. This subroutine can be used by any BASIC program.
11800 -11899	Subroutine	Kill ship routine: XK - ship number in the Active Ship List array SL% This routine kills the selected ship by removing it from the Active Ship list.
20000 -24999	Subroutine	Process Union ship turn: SH - ship number in the active ship list MP - number of movement points for ship SH This routine allows the user (Union) to select the current ship's action at this point in the round. The routine has several of its own subroutines to handle movement, weapons, and item use.
25000 -29999	Subroutine	Process Alliance ship turn: SH - ship number in the active ship list MP - number of movement points for ship SH This routine has the computer (Alliance) decide which action the ship SH should take at this point in the round. The routine calls as many of the process union ship subroutines as possible, in order to keep the code length down. This is accomplished through the strategic use of the update mode variable UP; making sure that the Union can not see cloaked Alliance moves. The finer points of this routine is described with great detail in installment three.

Entering the Program

Before entering this month's installment, load and run the CHK-LIST utility (located elsewhere in this issue). Once you have CHK-LIST loaded and ready, load your saved copy of Starship Combat from last issue. The listing in this issue only gives lines which have been added or altered. Finally, before you begin to add the new lines from this issue, there are a few lines which must be deleted from your previous version. You may remove these lines by typing the line numbers, one by one, following each with a press of the (RETURN) key. Here are the lines to delete:

Lines to DELETE: 25275 27200 27205 27210 27215
27220 27225 27230 27235

STARSHIP COMBAT

```
1062  20110 onxtgoto20200,20300,20400,20500,21
      500,23000,20800,20600,20900,21400
b395  23000 rem-
c689  23005 rem repairs
a832  23010 rem-
0990  23015 gosub11300
e88d  23020 print"Repairs:"
707d  23025 printoa$"{2 CRSR DN}(g)generate pw
      r"
a2ba  23030 printoa$"{3 CRSR DN}(p)patch hull"
93a0  23035 printoa$"{4 CRSR DN}(r)restore shl
      d"
0329  23040 printoa$"{5 CRSR DN}(b)build torp"
ef6b  23045 printoa$"{7 CRSR DN}({BACK ARROW})
      Abort"
```


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STARSHIP COMBAT *(cont.)*

```
27ec 23100 getxx$:ifxx$=""then23100
9e4c 23105 ifxx$="g"then23200
f480 23110 ifxx$="p"then23300
3786 23115 ifxx$="r"then23400
b62c 23120 ifxx$="b"then23500
226d 23125 ifxx$<>"{BACK ARROW}"then23100
10f5 23130 return
f19e 23200 rem-
0c62 23205 rem generate power
f19e 23210 rem-
d6af 23215 pw=pw+(mp*15)
addc 23220 xt=ty%(sl%(sh,0),1)
579b 23225 ifpw>xtthenpw=xt
9442 23230 mp=0
fcb8 23235 goto20255
0c5f 23300 rem-
7787 23305 rem patch the hull
0c5f 23310 rem-
4a4b 23315 hu=sl%(sh,7)+(mp*5)
ffd4 23320 xt=ty%(sl%(sh,0),3)
be3a 23325 ifhu>xtthenhu=xt
753c 23330 sl%(sh,7)=hu
295c 23335 pw=pw-(mp*5)
2497 23340 mp=0
8fbd 23345 goto20255
a832 23400 rem-
c281 23405 rem restore shields
b395 23410 rem-
558c 23415 ss=sl%(sh,6)+(mp*10)
b028 23420 xt=ty%(sl%(sh,0),2)
c1d3 23425 ifss>xtthenss=xt
520e 23430 sl%(sh,6)=ss
2b0c 23435 pw=pw-(mp*2)
38b2 23440 mp=0
80d0 23445 goto20255
62c3 23500 rem-
3736 23505 rem build torpedo
7964 23510 rem-
f5b3 23515 ifmp>2then23555
4da2 23520 : gosub11300
c1b2 23525 : print"Can't!"
5641 23530 : printoa$"{2 CRSR DN}A torpedo bu
     ild"
f958 23535 : printoa$"{3 CRSR DN}requires 3 m
     p's"
2063 23540 : printoa$"{5 CRSR DN}(press a key
     )"
0521 23545 : getxx$:ifxx$=""then23545
9975 23550 : goto20000
112f 23555 ifsl%(sh,8)<ty%(sl%(sh,0),6)then23
     585
4874 23560 : gosub11300
95c3 23565 : print"Can't!"
d17b 23570 : printoa$"{2 CRSR DN}Torpedo bays
     "
1760 23575 : printoa$"{3 CRSR DN}are full"
cd23 23580 : goto23540
3c26 23585 sl%(sh,8)=sl%(sh,8)+1
7d0d 23590 pw=pw-25:mp=mp-3
cbae 23595 goto20255
aecd 25065 f3=0:if(sl%(sh,6)+sl%(sh,7))<(.75*
     ty%(sl%(sh,0),3))thenf3=1
ce32 25067 ifsl%(sh,5)<(.15*ty%(sl%(sh,0),1))
     thenf3=1
9740 25235 iff2andf3then26100
2b41 25237 iff3then26600
1a88 25270 goto26100
87ad 25325 iff2andf3then26100
3aa9 25327 iff3then26600
ad84 25360 goto26100
0ee9 25440 : goto26100
```

STARSHIP COMBAT *(cont.)*

```
66e0 25450 goto26100
c0ff 26115 f4=sl%(sh,5)/ty%(sl%(sh,0),1)
876c 26120 f5=sl%(sh,6)/ty%(sl%(sh,0),2)
d819 26125 f6=sl%(sh,7)/ty%(sl%(sh,0),3)
1eb0 26130 iff1=0orsl%(sh,10)=1then26150
78aa 26135 gosub11300:printty$(sl%(sh,0))
7fd5 26140 printoa$"{CRSR DN}effects repairs"
fb87 26145 up=1:gosub11400
377f 26150 iff4>.2andf5>.8andf6>.2andmp>2ands
     l%(sh,8)<2then23500
44db 26152 iff4>.2andf6>.2then26170
08a8 26155 : iff4>f6then23300
09a9 26160 : ifsl%(sh,0)>7then22400
d6ac 26165 : goto23200
050c 26170 iff5>.8then26155
aa35 26175 ifsl%(sh,0)<8then26185
b5a1 26180 : iff5<.2then22200
41d5 26185 : goto23400
```

REMEMBER... ALWAYS SAVE YOUR WORK BEFORE TRYING IT OUT... JUST IN CASE!

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How to Type In Program Listings Appearing in Commodore World

While *Commodore World* currently doesn't make it a habit of publishing type-in programs, a number of our columns do require entering sample routines. For this purpose, we have created our CHK-LIST utility for the Commodore 64 and 128. This utility uses a 16-bit CRC checksum method to verify that you have correctly entered each program line, and that each of the characters in the program lines are in the correct order.

You'll notice that program listings appear with a column of values to the left of the program lines. These values are the CHK-LIST values and are not to be entered as part of the program. A similar set of values are generated by the CHK-LIST utility to allow you to verify that everything has been entered correctly.

Enter the CHK-LIST program from BASIC. You can use either a C-64 or a C-128 computer. If you use a C-128, it can be in either 64 or 128 mode. Be sure to enter each line carefully to avoid mistakes—until you actually have CHK-LIST working, finding errors in program entry won't be easy. After you have finished entering the program, be sure to SAVE a copy to disk before you attempt to RUN it, just in case. If you aren't familiar with how to save a program to disk, you can use the following command:

```
SAVE"CHK-LIST",8
```

To use CHK-LIST, load it into your computer and type RUN. Make sure that any program you are currently working on is saved first, or start CHK-LIST before you begin typing in a new program. After you have CHK-LIST in memory and running, type NEW. You may now either load or begin typing the program you wish to have CHK-LIST check on. Whenever you want to check your program, type in the appropriate SYS command given below:

C-64 or C-128 in 64 mode:	SYS49152
C-128 in 128 mode:	SYS4864

Note that when typing in listings, some special characters will appear in braces. For example, {CLR/HOME} means that you should enter the Clear key, which is done by holding down the SHIFT key while you press the HOME key. Other times you may see a number ahead of the key name, such as {3 SPACES} or {5 CRSR L}. This means you should press the key indicated the number of times shown. Most special keys are easy to identify, since the text shown will generally match the text on the key. Exceptions are the space bar {SPACE}, and cursor keys which include directions ({CRSR UP}, {CRSR DN}, {CRSR L} and {CRSR RT}). Be sure to use the correct key combinations for color keys, such as <CTRL><2> for {WHT}.

CHK-LIST

```
A454  10 F=ABS(PEEK(65533)=255):M=49152:IFFTHE
      NM=4864
6E2F  12 C=Ø:PRINT"{CLR/HOME}WORKING";
E35Ø  2Ø READD:IFD=-256THEN4Ø
AD2Ø  3Ø C=C+D:IFD<ØANDF=ØTHEN2Ø
3316  31 IFD<ØTHEND=Ø-D:M=M-1
Ø7FØ  32 POKEM,D:M=M+1:PRINT".";:GOTO2Ø
578A  4Ø PRINT:READCK:IFC<>CKTHENPRINT"ERROR I
      N DATA STATEMENTS!":END
Ø679  5Ø PRINT"DONE.":END
8D92  6Ø :
E7FE  49152 DATA 165,43,-45,133,251,165,44,-46
      ,133,252
B2AE  49160 DATA 169,Ø,141,36,193,-2Ø,169,147,
      32
CD5Ø  49168 DATA 21Ø,255,32,194,192,-19,16Ø,Ø,
      14Ø
C9CD  49176 DATA 37,193,-2Ø,177,251,133,253,2Ø
      8,3
2Ø58  49184 DATA 238,37,193,-2Ø,2ØØ,177,251,13
      3,254
EA9C  49192 DATA 2Ø8,3,238,37,193,-2Ø,173,37,1
      93,-2Ø
6C15  49200 DATA 2Ø1,2,2Ø8,1,96,2ØØ,177,251
E7ØE  49208 DATA 17Ø,2ØØ,177,251,32,2Ø5,-5Ø,18
      9,-142,169
6795  49216 DATA 6,133,211,-236,169,61,32,21Ø,
      255
F8ØF  49224 DATA 169,32,32,21Ø,255,16Ø,2,177
9735  49232 DATA 251,32,213,192,-19,2ØØ,177,25
      1,32
Ø734  49240 DATA 213,192,-19,2ØØ,177,251,24Ø,6
      ,32
D99D  49248 DATA 213,192,-19,76,9Ø,192,-19,173
      ,191,192,-19
AC3Ø  49256 DATA 32,167,192,-19,173,19Ø,192,-1
      9,32,167
```

CHK-LIST *(cont.)*

```
B343  49264 DATA 192,-19,169,13,32,21Ø,255,165
      ,253
DF3A  49272 DATA 133,251,165,254,133,252,238,3
      6
A6E2  4928Ø DATA 193,-2Ø,173,36,193,-2Ø,2Ø1,2Ø
      ,24Ø,3
936E  49288 DATA 76,18,192,-19,162,Ø,189,1,193
      ,-2Ø
8C3A  49296 DATA 24Ø,6,32,21Ø,255,232,2Ø8,245,
      32
EB74  493Ø4 DATA 228,255,2Ø1,13,2Ø8,249,32
6Ø95  49312 DATA 228,255,2Ø8,251,76,8,192,-19,
      72
AØØ1  49320 DATA 1Ø6,1Ø6,1Ø6,1Ø6,32,18Ø,192,-1
      9,1Ø4
FAA2  49328 DATA 32,18Ø,192,-19,96,41,15,17Ø,1
      89
EBFD  49336 DATA 2Ø,193,-2Ø,32,21Ø,255,96,Ø,Ø
E9Ø7  49344 DATA Ø,Ø,169,Ø,141,19Ø,192,-19,141
E8EA  49352 DATA 191,192,-19,169,33,141,192,19
      2,-19,169
A7D7  493ØØ DATA 16,141,193,192,-19,96,162,8,7
      2
6Ø4Ø  49368 DATA 41,127,77,191,192,-19,141,191
      ,192,-19
D24B  49376 DATA 24,14,19Ø,192,-19,46,191,192,
      -19,144
D52F  49384 DATA 18,173,192,192,-19,77,19Ø,192
      ,-19,141
DCA6  49392 DATA 19Ø,192,-19,173,193,192,-19,7
      7,191,192,-19
6Ø32  494ØØ DATA 141,191,192,-19,1Ø4,1Ø,2Ø2,2Ø
      8,215
37C5  494Ø8 DATA 96,13,8Ø,82,69,83,83,32
9A2A  49416 DATA 6Ø,82,69,84,85,82,78,62
AC9Ø  49424 DATA 13,13,13,Ø,48,49,5Ø,51
FE71  49432 DATA 52,53,54,55,56,57,65,66
Ø17E  4944Ø DATA 67,68,69,7Ø,Ø,Ø,-256,37944
```


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SCSI MAGIC

by Doug Cotton

In our last installment, we presented the first revision of a SCSI utility program. As fate would have it, one error crept in; instead of reading SCSI blocks as it was intended to do, the program sent the SCSI Read Capacity command. If you change the CHR$(37) in line 2010 to a CHR$(40), this error will be corrected and the program will operate as intended. But rather than do that, you may just want to move right on into the new version of SCSI Commander presented in this issue. And yes, this one does correctly read SCSI blocks.

As I mentioned last issue, we're going to start expanding the capabilities of SCSI Commander. In actuality, most of the code from the first version has been completely replaced by these changes, so it would probably be best to just type in the entire program as presented in this issue, as opposed to trying to modify last issue's version.

There are two main improvements in this new version of SCSI Commander. The first is that the user interface has been cleaned up a little; it's still far from being what you might call "commercial quality", but it will suffice for now, and will help keep prompts and other information out of the way of our main display.

The main display? Yes, that's the second enhancement in this version. In addition to reading SCSI blocks, this new version also shows you the data stored there—in either hexadecimal, or ASCII. A small machine language routine has been employed to help speed the process of fetching this data from the drive and show it on the screen—BASIC is just a tad slow when it comes to I/O.

Taking a quick look over the program, here's the general gist of what does what:

Lines 10-60 All that program name and copyright stuff.
Lines 70-90 Line 70 starts with a call to the subroutine that sets up the machine language; the remainder of line 70 and the following lines set up the required variables.
Lines 100-999 This is the main section of the program, which first clears the screen and prints the program name and SCSI device parameters on the display. It then checks to see if anyone has bothered telling the program what Commodore device number is supposed to be a CMD HD (line 140). If not, a quick call to the subroutine that requests that information ensues (GOSUB 5000), and jumps back to the beginning of this section. Once the program makes it past the device setting check, it sets up some variables (line 160) and calls the SCSI block read routine (line 170). This done, it re-displays the SCSI parameters (in case of an error), then displays the data from SCSI block. Exhausted, the program now drops into the main command loop where it waits for you to tell it what else to do.
Lines 1000-1020 Opens a command channel to the drive.
Lines 1100-1110 Closes the command channel.
Lines 2000-2050 Reads a SCSI block
Lines 4000-4240 Display routines for printing SCSI data on the screen.
Lines 4800-4860 Subroutine to build the machine language routines.
Lines 4864-4992 Data statements containing the machine language.
Lines 5000-5420 Input routines for the options.
Lines 6000-6030 SCSI Parameter display subroutine.
Lines 7000-7000 Subroutine to clear the command and input display area.
Lines 20000-20380 SCSI error detection subroutines.

And that pretty much does it for this time. So type it in, analyze it, and snoop around a bit in your hard drive until next issue!

SCSI COMMANDER

```
c4b0  10 rem ------------------------------
2334  20 rem       scsi commander v0.20
059b  30 rem          copyright 1994
d893  40 rem   creative micro designs, inc.
70e2  50 rem ------------------------------
8d92  60 :
f512  70 gosub4800:dimsb%(27):bl=0:bh=48:hx$="
      0123456789abcdef"
1eaa  80 cc(1)=15:cc(2)=14:s1=0:de(1)=0:lu(1)=
      0:ra=0:gosub5310:tl=1:gosub5410
2517  85 bl$="{39 SPACES}"
e50d  86 m$="{HOME}{23 CRSR DN}"
4cff  90 :
5560  100 rem menu
6bec  110 print"{CLEAR/HOME}scsi commander"
79a2  120 print "{14 CMDR t}"
a020  130 gosub6000
a85e  140 cd=1:ifs1=0thengosub5000:goto110
8d92  150 :
09c8  160 gosub5310:gosub5410
04a5  170 gosub1000:gosub2000:gosub1100
8e01  180 pg=0
4cff  250 :
d2fb  280 gosub6000
6491  350 ifpg>(tl*2-1)thenpg=0
386c  360 gosub4000
7fce  370 :
0352  400 gosub7000:print"(p)age, (+), (-), (m
      )ode, (a)ddress"
be11  402 print"(s)ource, (d)ev, (l)un, (q)uit
      {HOME}"
53f1  410 getk$:ifk$=""then410
24be  420 ifk$="p"thenpg=pg+1:goto350
c03e  430 ifk$="m"thenmd=abs(md-1):goto350
99dd  440 ifk$="+"thenra=ra+1:goto160
d212  450 ifk$="-"thenra=ra-1:goto160
4e0a  460 ifk$="s"thengosub5000:goto160
34f0  470 ifk$="d"thengosub5100:goto160
cebc  480 ifk$="l"thengosub5200:goto160
c9a1  490 ifk$="a"thengosub5300:goto160
12d0  500 ifk$="q"thenprint"{CLEAR/HOME}":end
1700  510 goto410
d75d  999 :
28e7  1000 rem open source device
```


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SCSI COMMANDER *(cont.)*

```
84d0 1010 opencc(cd),s1,15
f1bb 1020 return
0235 1030 :
a366 1100 closecc(cd)
0e4e 1110 return
c358 1120 :
e5d7 2000 rem read block
724b 2010 ss$=chr$(40)+chr$(lu(cd)*2^5)+chr$(
     a3)+chr$(a2)+chr$(a1)+chr$(a0)
c369 2020 ss$=ss$+chr$(0)+chr$(11)+chr$(10)+c
     hr$(0)
5355 2030 print#cc(cd),"s-c"chr$(de(cd))chr$(
     bl)chr$(bh);ss$
bc1e 2040 gosub20000
4084 2050 return
cef1 2060 :
6459 4000 rem read/display buffer
5f64 4010 gosub1000
9c0d 4030 print#cc(cd),"m-r"chr$(bl)chr$(bh+p
     g)chr$(0)
b09f 4040 print"{HOME}{5 CRSR DN}";
55c0 4045 sys(sa):gosub1100:poke251,0
2f08 4046 ifmd=1then4200
62a3 4050 fori=0to15
8c0c 4060 :print"$0";mid$(hx$,pg+1,1);mid$(hx
     $,i+1,1);"0: ";
4193 4070 :sys(sa+25):print
a13b 4080 next
e1bf 4090 return
cd82 4100 :
4457 4200 fori=0to15
e36a 4210 :print"$0";mid$(hx$,pg+1,1);mid$(hx
     $,i+1,1);"0: ";
4d81 4220 :sys(sa+77):print
dfb3 4230 next
0094 4240 return
5221 4250 :
0a3f 4800 sa=49152:ifabs(peek(65533)=255)then
     sa=4864
ec2f 4810 l=sa
6218 4820 readd:ifd<0then4840
3683 4830 pokel,d:l=l+1:goto4820
6fbf 4840 ifsa=4864thenreturn
49db 4850 pokesa+17,193:pokesa+29,193:pokesa+
     38,192:pokesa+48,192:pokesa+86,193
c1f9 4860 return
934c 4862 :
61c6 4864 data 165,186,32,180,255,169,111,32,
     150,255,162,0,32,165,255,157
9765 4880 data 0,20,232,208,247,32,171,255,96
     ,166,251,189,0,20,72,74
be5e 4896 data 74,74,74,170,189,61,19,32,210,
     255,104,41,15,170,189,61
8c0c 4912 data 19,32,210,255,230,251,165,251,
     41,15,208,221,96,48,49,50
99ab 4928 data 51,52,53,54,55,56,57,65,66,67,
     68,69,70,169,34,32
3a5a 4944 data 210,255,166,251,189,0,20,201,1
     3,240,16,201,20,240,12,201
7cd1 4960 data 27,240,8,201,34,240,4,201,141,
     208,2,169,46,170,32,210
c7c0 4976 data 255,230,251,165,251,41,15,208,
     217,169,34,32,210,255,162,14
cb02 4992 data 169,32,32,210,255,202,208,250,
     96,-1
c983 4999 :
221d 5000 gosub7000:input"commodore source de
     vice";s1
33a5 5010 return
bdd0 5020 :
4ce5 5100 gosub7000:input"scsi device";de(1)
```

SCSI COMMANDER *(cont.)*

```
f2c8 5110 return
dd86 5120 :
34b9 5200 gosub7000:input"scsi lun";lu(1)
d1fd 5210 return
1ceb 5220 :
09f7 5300 gosub7000:input"scsi block";ra
61ac 5310 a0=ra:a3=int(a0/(256^3)):a0=a0-a3*(
     256^3)
da06 5320 a2=int(a0/(256^2)):a0=a0-a2*(256^2)
3e0b 5330 a1=int(a0/256):a0=a0-a1*256
0d3d 5340 return
1ceb 5350 :
1578 5400 gosub7000:input"transfer length";t1
695b 5410 l0=t1:l1=int(l0/256):l0=l0-l1*256
60c2 5420 return
7114 5430 :
f3b2 6000 print"{HOME}{2 CRSR DN}";bl$:printb
     l$;"{HOME}";
7aad 6010 print"{HOME}{2 CRSR DN}source:";s1;
     "dev:";de(1);"lun:";lu(1);"ad:";ra
fa02 6020 print "status: ";em$;" ek:";sk%;"ec
     :";sc%;"lb:";lb
60c2 6030 return
add4 6040 :
3c4c 7000 printm$;bl$:printbl$;"{HOME}";m$;:r
     eturn
321e 20000 rem check for scsi error
49c9 20010 get#cc(cd),e$:e=asc(e$+chr$(0))
4c9a 20020 :
f124 20030 rem check for error
4e36 20040 ex=0:em$="ok"
1210 20050 ife<>0then20080: rem process error
0382 20060 return
1254 20070 :
9e6b 20080 ex=1: rem there is an error
ad9c 20090 ife= 2thenem$="scsi error":goto201
     60: rem check condition
7133 20100 ife= 8thenem$="target busy"
c58a 20110 ife=16thenem$="int. status ok"
f305 20120 ife=24thenem$="res. conflict"
feb8 20130 ife=48thenem$="dos syntax error"
5d4c 20140 return
4c9a 20150 :
c0c3 20160 rem check condition
4e01 20170 ss$=chr$(3)+chr$(lu(cd)*2^5)+chr$(
     0)+chr$(0)+chr$(27)+chr$(0)
fa5e 20180 print#cc(cd),"s-c"chr$(de(cd))chr$
     (bl)chr$(bh);ss$
321c 20190 get#cc(cd),e$:e=asc(e$+chr$(0))
4754 20200 ife=0then20260
8df7 20210 :
edcf 20220 rem fatal error
c07f 20230 ex=2:em$="fatal error{11 spaces}"
f1de 20240 return
a36b 20250 :
f715 20260 rem fetch error data
eb2f 20270 print#cc(cd),"m-r"chr$(bl)chr$(bh)
     chr$(27)
e8ba 20280 fori=0to26
73d1 20290 : get#cc(cd),b$
2e8d 20300 : sb%(i)=asc(b$+chr$(0))
7037 20310 next
fda5 20320 :
2ad1 20330 rem process error data
1b5b 20340 sk%=sb%(2)and15
781e 20350 sc%=sb%(12)
ee5e 20360 lb=-1:ifsb%(0)<127thenreturn
845e 20370 lb=sb%(3)*256^3+sb%(4)*256^2+sb%(5
     )*256^1+sb%(6)*256^0
2d1e 20380 return
a36b 20400 :
```


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ADVANCED TECHNIQUES

TEXT ADVENTURE GAME DATA STRUCTURES

by John Leeson

Text adventure games are not only fun to write, but they are helpful to a new programmer in learning to handle many programming principles and structures. If written well, a text adventure program is mainly an interpreter of the data. Which is why it is also called an Adventure Interpreter. Since it is so highly data dependent, it is very important for program performance and capability to correctly set up the data structures. That is the main topic of this article.

Action Words

Most text adventure data uses lists. Some of the data is fixed. That is, non-variable and not specific to the adventure. The typical list of verbs, such as go, get, and drop, for example. The best way to handle this is a list of all acceptable verbs and a list of matching verb numbers. This allows for several different words to have the same effect without having to duplicate any executable code. A portion of this list might look like this:

go	1	put	4
walk	1	drop	4
run	1	leave	4
move	1	hit	5
take	2	strike	5
get	2	eat	6
grab	2	drink	7
throw	3	light	8

In response to a player input of "walk east" the program can search the verb list until it finds a match for "walk". When it finds it, then it gets the matching verb number, in this case 1, which it can use to execute a branching instruction to handle that verb. "Go east", "run east", or "move east" all parse to the same verb number, and thus have the same effect. You would typically use an ON x GOSUB statement to branch to a subroutine to handle the verb number you found from the list.

A convenient structure for this is a string array for the verb words and an integer array for the verb number. Let's use VB$(50), VB%(50) for these variables. This gives enough room to have 50 verbs. As you will find, 50 is a relatively small verb vocabulary for a text adventure game, but it's large enough to have some fun. To initialize the arrays use DATA statements like this:

```
DIM VB$(50),VB%(50)
FOR I=1 TO 50
    READ VB$(I),VB%(I)
NEXT I
DATA "GO",1,"WALK",1,"RUN",1,"MOVE",1
DATA "TAKE",2,"GET",2,"GRAB",2
DATA ...
```

An integer array is used because integers only take up two bytes of memory in an array while normal numeric variables take up five. You will be using some rather large data structures in text adventures to hold all the different verbs, items, adventure maps, etc. So it is a good idea to save memory by using integer arrays for the numeric data.

Making a Map

The next type of data to be handled is static data. Static data, like fixed data, does not change during the execution of the adventure driver program. However, it might be different, and usually is, between different adventures that you create. Typical of static data is the adventure map. It's a little difficult at first to see how you can draw a 'map' in a program, but there is a convenient data structure to use for the map. It is the multi-dimensioned array. If you give each room or map location a number and call that the 'room number', then that will be the first index into your map array. The second index will be a direction from that location.

WHAT'S A PARSER?

The accompanying article mentions parsing and a command line parser in several places. The parser in a text adventure game determines the feel of playing the game. A simple parser requires pigeon English commands, sometimes with only three significant characters per word. More sophisticated parsers are able to make sense out of complete phrases with fairly complex sentence structure. In the first type, a typical command might look like "tak lan" for 'take lantern'. More typical of modern parsers (although a classic text adventure 'Zork' also is this way) would be the parser that can decipher "turn off the lantern and put it in the backpack." In any case, the parser is responsible for dividing the input command string up into discrete words and performing the lexical analysis for the adventure interpreter.

An aid to having a responsive command line parser is to have lists of legal words as was described in the main article. For the more sophisticated parser, the minimum lists of verbs and objects discussed in the main article might need to be expanded to include lists for adjectives (red, blue, other colors, big, nasty, etc.), adverbs (in, on, within, out, from), and other commonly used words (the, a, and, it, etc.). The more sophisticated you make your command line parser, the better the feel of your adventure game will be.

It will also be slower. Consider that the parser has to scan the input line looking for a space. It then takes the string of letters from the beginning of the line to the space and calls that a word. It then scans the list(s) of legal words looking for a match so that it can return a word type and number for each word in the command line. Parsing a command can take a long time with long lists of verbs, objects, and possibly other sentence elements. For this reason, you may want to consider writing the command parser as a machine language routine even if you write the body of the adventure interpreter in BASIC. Alternatively, you may use one of the BASIC compilers to get better responsiveness out of a program with a sophisticated parser.

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Lets assign the directions N, E, S, W, Up, and Down the values 0, 1, 2, 3, 4, and 5. Using an integer array, you might dimension the map array as MA%(50,5) which allows 50 rooms and six movement directions from each room. The value that you enter into the map array is the room number to which the player would go if he moved the indicated direction. The player cannot move in some directions from some rooms. Use a 'room number' of -1 as a flag for this, indicating that there is no path out of the room in that direction. Thus if the map array for room number 6 had values like this:

```
ma%(6,0) = -1 : ma%(6,1) = -1 : ma%(6,2) = 6
ma%(6,3) =  1 : ma%(6,4) = -1 : ma%(6,5) = 5
```

It would give a map that looks like this in tabular form:

ROOM 6
- N - no exit
- E - no exit
- S - return to room 6
- W - room 1
- U - no exit
- D - room 5

Rather than enter 50 or so lines of assignment statements as shown above, you would use DATA statements again to read the map data into the array. For each room you need six items of data; the room to which you go if you go that direction from the room. The program might look like this:

```
MR = 52
DIM MA%(52,5)
FOR I=1 TO MR
   FOR J=0 TO 5
      READ MA%(I,J)
NEXT J,I
DATA -1,-1, 2,-1,-1,-1 : REM ROOM 1
DATA  1,-1,-1, 3,-1,-1 : REM ROOM 2
DATA -1, 2, 4,-1, 1,-1 : REM ROOM 3
DATA ...
```

This map has an exit from room 1 south to room 2. From room 2 the player can go north to room 1 and west to room 3. From room 3 you can go east to room 2, south to room 4, and up to get to room 1. Since there is no reverse route down from room 1 to room 3, perhaps this is a one way trapdoor in room 1 that has no handle on it.

This idea points up the need for the next piece of data to go with the maps. You need room descriptions for them. This again is static string data, so you can use a string array. The array will have the same number of entries as there are rooms, and each description will be a string. The program fragment for it might look like this for the initialization:

```
DIM RM$(52)
FOR I=1 TO MR
   READ RM$(I)
NEXT I
DATA "ENTRY FOYER.  A TRAPDOOR IN THE FLOOR,
BUT NO HANDLE."
DATA "KITCHEN.  THIS PLACE IS MESSY. SOMEONE
LEFT BONES ALL OVER."
DATA "DINETTE.  MORE BONES. A PULL DOWN LADDE
R WITH A TRAP DOOR."
DATA...
```

Of course you would want the pathway back to the entry foyer to come through a basement or some such to make your map consistent. The short path here is for illustration purposes.

Dynamic Data

So far all our data has been fixed or static. None of these things change or move during an adventure. The one remaining important piece of data is the objects, items and nouns, that exist in the adventure game. When your player types "take jewels" or "strike bell" you need a way to determine what is affected and how. These things have a dynamic nature in that they may move from one location to another.

To identify these items for the command parser, an appropriate data structure would be similar to the verbs' structure. That is, a string array to hold the item name and an integer array to hold the item number. This permits an item to have more than one name for purposes of recognizing a player action. For example, the command above, "take jewels", might have been because the player saw "A bag of diamonds and rubies." For this item you might want to permit the player to call it "bag", "gems", or "jewels". With a structure like the verbs have, you could then have "bag", "gems" and "jewels" all return an item number of 5, for example, from the parser.

Now you need an additional data structure for the items, to hold the item location and description. The item location is the room number, so is an integer. The description is a string, so belongs in a string array. The item number is the index to the item location and description arrays. All together, then, the coding fragment for the item setup might look like this:

```
DIM I$(50),I%(50)
FOR I=1 TO 50
   READ I$(I),I%(I)
NEXT I
DATA "MATCHES",1,"GLASS",2
DATA "WATER",3,"LAMP",4
DATA "GEMS",5,"BAG",5
DATA "JEWELS",5
...
DIM IT$(30),IL%(30)
FOR I=1 TO 30
   READ IT$(I),IL%(I)
NEXT I
DATA "BOOK OF MATCHES",0
DATA "EMPTY GLASS",12
DATA "GLASS OF WATER",-1
DATA "DIRTY OLD LAMP",22
DATA "BAG OF DIAMONDS AND RUBIES",5
...
```

There are a couple of special things now in this list of items and locations. Notice that the book of matches is in a location number 0. In the previous data setups you may have noticed that there is no location (room number) of 0, so this indicates something special. It is convenient to have the player be location 0, then any item that the player has picked up will be at location 0. So the book of matches starts out in the player's items inventory.

Second, the Glass of water starts out at location -1. Again, there is no location number -1. There cannot be, because location numbers serve as

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the index to an array, which cannot be negative. Location -1 refers to nowhere, or limbo, so to speak.

Playing the Game

A fragment of game play is the best way to illustrate the use of locations and adventure interpreter program actions associated with this data structure. Lets say that the player enters room 12. The program will scan the IL%() array looking for items that have a location of 12. It finds that IL%(2) = 12, so item #2 is in the room. It can then print "You see: A [empty glass]" where the description in brackets came from IT$(2).

Now if the player types "take glass", the adventure interpreter finds that "glass" is item #2 and item #2 is in the same room as the player (room 12). So it changes the location of item 2 to location 0 by setting IL%(2)=0 (on the player) and responds "taken". Then if the player types "inventory" to get an inventory of items he has, the fragment of code:

```
PRINT "YOU HAVE:"
FOR I=1 TO 30
    IF IL%(I)=0 THEN PRINT "THE ";IT$(I)
NEXT I
```

Would now print:

```
YOU HAVE:
THE BOOK OF MATCHES
THE EMPTY GLASS
```

This data structure and logic will permit the player to type "get water" at a location where there is water present (pond, sink, drinking fountain, etc.) IF he has the empty glass. The adventure interpreter can then change item #2 location to be -1 and change item #3 to be in location 0. Then the GLASS OF WATER will be on the player instead of the empty glass. A command "drink water" would check to see if item #3 was on the player. If it is, then it can print an appropriate message ("Ahhh, very refreshing"), set IL%(2)=0, set IL%(3)=-1 and the player again has an empty glass.

Next Steps

The data structures presented so far are enough to handle the basic adventure game. With more programming effort, you can build on these basic structures to expand the capability of the adventure interpreter. Some suggested enhancements are in the paragraphs below.

First, you can expand the items' structure to add a second dimension to the item location integer array, IL%(). Making the IL% array look like IL%(30,1) will let you have two pieces of information about each item. The first, IL%(x,0), will still be the item's location. The second, IL%(x,1) can be an attribute. You may, for example, have attributes like these:

No.	Attribute	Details
1	Small size	Can be picked up
2	Large size	Can't be taken or carried
3	Container	Can hold small items
4	Vault	Holds small items, but cannot be carried
5	Monster	Might be hit, moves from place to place by itself, cannot be carried or taken
6	Etc.	Use your imagination

With this added bit of information about items, you can have your player *PUT* items in other items. You might find a back pack (attribute 3), for example, that you can carry and can also put other (small) things inside. Or your player might see a desk (attribute 4) that has objects inside, but he cannot take the desk. Your player, upon entering a room, might now see a kitten (attribute 5) that has wandered into this room from some other room where he saw it before.

Adding an attribute of 'container' to objects has an impact also to the item location array. Before, an integer value in the item location array pointed to a room where the item was located. So a condition where IL%(5)=12, for example, meant that item #5 was located in room #12. With the addition of a container property, an item might be inside another item. One way of handling this is to make items with the container property have a dummy location number also. This requires some unique coding, but is not difficult to handle with a limited number of items that have the container property.

Another way to handle it would be to add a constant to the container item's item number and store that in the item location array. For example, if item #7 is a backpack and you put the empty glass (item #2) into the back pack, then you could set IL%(2)=1000+7. You could find all items that are in the backpack, then, by scanning the IL%() array for a location of 1000 plus the backpack item number.

Implementing containerism also has an impact on your command parser. The basic structures for the adventure interpreter were such that all user commands could be in the form of a verb followed by an object (drop bag, take glass, etc.). With the addition of containers, you will now have to contend with indirect objects also. The 'put' class of verbs needs to process the information about where to put the objects, such as "put the bag in the backpack" or "put the matches in the desk." Of course, with more work comes more fun!

Another enhancement might be to expand the ability to move. You could add north-east, south-east, etc. to the movement directions. The necessary adjustment to the map location array MA%(), is probably obvious... increasing the second dimension from 5 to 9. That is, instead of being MA%(x,5) it would be MA%(x,9).

You might also want to permit the player to save a game in progress to disk so it can be resumed later. Now that you have all of the game state in variables that is not hard to do. All you need to do is to write the player's location to disk, then the contents of the IL%() array for item locations. Next time the game is started it will initialize all of the arrays to the original starting state. But in response to a "load game" command from the player, reading in the saved contents of the item location array and setting the player location variable is all that is needed to go to the saved game state.

Conclusion

Text adventure games are not as popular now as they were a few years ago. There are many people who still enjoy them, however, and a few people who are enthusiasts. You can give these potential players a game to play and improve or develop your programming skills at the same time by exercising your creativity in a text adventure program. This article has hopefully helped with the basic knowledge of the data structures used in text adventure games so that you can roll one up.

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Peripheral Vision

By Jim Butterfield

MAKING IT NEAT: SIMPLE TIPS ON BETTER LOOKING OUTPUT

When you send data from your computer to a peripheral device, it pays to make sure it's clean data. If the information is going to a printer, or to some other computer via a modem, it should look good, of course. And if your data is going to a disk file, to be read back later: well, the better you write it, the easier it will be to read when you need it. To reverse the old maxim: garbage out would subsequently produce garbage in.

As I have mentioned before, the stuff that flows out to your peripherals looks the same as when goes to the screen. The difference between PRINT and PRINT# is slight. Learn how to make your data look good on the screen, and it will look good anywhere.

Text File Snooping

It's easy to write a quick program that will examine the contents of a simple sequential (SEQ) text file on disk. Program Listing 1 gives an example of a quick text file reader.

Don't forget the semicolon characters that end lines 140 and 150. Put your own file name into line 100. If you're interested in programming, you may find the code instructive. GET# is slow compared to INPUT#, but it gets everything. Variable A$ is a character from the file; if a NULL character is seen, it's corrected to a binary zero. Variable B is the numeric (ASCII) value of the character, and C is a special version to test for control codes.

When you run the program, any special control characters in the file will be shown in reversed form on the screen. One control character, reverse-m, is the RETURN character, and you should expect to see it at the end of each line of text. Any other reverse font characters should be viewed with suspicion: be sure you know what such special functions as form feeds or color changes are doing in the file.

If your data-reading program is written in BASIC and uses the INPUT# statement, watch closely for three special characters that can create problems: the comma, the colon, and the quotation (double-quotes) mark.

PROGRAM LISTING 1

```
F4FC  100 OPEN 1,8,2,"MYFILE"
7DA2  110 GET#1,A$ : IF A$="" THEN A$=CHR$(0)
B6F3  120 B=ASC(A$) : C=B AND 127
F218  130 IF C<32 THEN A$=CHR$(18)+CHR$(B+64)+
      CHR$(146)
8B84  140 PRINT A$;
2DFF  150 IF B=34 THEN PRINT A$;CHR$(20);
F1F2  160 IF C=13 THEN PRINT
ECCA  170 IF ST=0 GOTO 110
8F4C  180 CLOSE 1
```

Commodore 128 Note

Many of the operations I will describe next can be done more easily in BASIC 7 (for the 128) by means of the PRINT USING statement. We'll summarize that usage as we go. Meanwhile, you might still opt for the alternative coding, so that your code will be transportable to other Commodore machines such as the 64.

Neat Screen Output

Here's the easy way to get things to look good on your screen or printer. Data would fit neatly into columns if it were always the same length. So... force each data field to be the same length. Stretch out the short strings (tack on spaces), and chop the long ones. In fact, you should do both: first, tack on extra spaces, and then snip the resulting string to the correct size. "Tacking on" is called concatenation, and the snipping is done with BASIC's LEFT$() or RIGHT$() function.

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Most strings are shown left-justified, that is, lined up on the left side. So we tack the extra spaces on the right side, and trim with function LEFT$(). Thus, to print G$ as a 20-column-wide string, we would code:

```
S$="{16 SPACES}" : PRINT LEFT$(G$+S$,20)
```

It's usually best to define a string of spaces near the start of your program. I have used S$ in the example above. Be sure to put in enough spaces to provide "padding" for any string size.

The last string printed on a line usually does not need the padding. For example, to type strings A$, B$ and C$ you could code (assuming S$ defined as above):

```
PRINT LEFT$(A$+S$,15);LEFT$(B$+S$,10);C$
```

You might still wish to put the padding in for C$ in some circumstances: for example, if you had positioned the cursor to type over a previous line. On the 128, the following code will print A$ and B$ left- and right-justified, respectively.

```
PRINT USING "######## >#######";A$,B$
```

Formatting Numbers

We like to right-justify numbers, so that they line up neatly in columns. If the numbers are integers (no fractions), the job is easy. Convert to a string with STR$(), tack the spaces on the front, and trim to size. Thus, using S$ as defined before, we could code:

```
PRINT RIGHT$(STR$(X%),6);RIGHT$(STR$(M),8)
```

Variable X% is an integer, of course; and M had better have an integer value, or the output will look messy. You could use function INT(M) to trim the value, or INT(M+.5) to round it.

Be sure that you provide enough space to hold the entire number, including the minus sign if appropriate. It would be annoying to print the value 123.67 as 23.67, especially if it's *your* money we're talking about.

When we need to deal with numbers that have fractional parts—and that includes dollars-and-cents values—we must take more care in coding. The decimal points need to line up, and that means we must decide in advance how many decimal places must be shown.

Decimal Point Values

Converting a floating-point number to a printable value, complete with decimal point, is sufficiently tricky that I wrote a canned subroutine long ago to do the job in the most general way.

You'll find this routine in Program Listing 2. Set variable V to the value you want to print, V1 to the number of places you want shown before the decimal point, and V2 to the number of digits after the decimal.

After you call this routine, supplying values for V, V1 and V2, you'll get back a string V$ which will be ready to print. If you're interested in coding details: there's an incomplete loop on line 50050, which is harmless when used within a subroutine; and a boolean expression (-1 for true, 0 for false) is used in arithmetic in line 50080.

On the 128, PRINT USING "####.##",N will arrange the value neatly for you, rounding it as appropriate. You can even arrange to "fill" the empty spaces by the use of command PUDEF.

PROGRAM LISTING 2

```
1320  50000 REM 'PRINT USING' EQUIVALENT
D762  50010 REM PRINT VALUE V IN FORMAT V1.V2
C73B  50020 V4=INT(V * 10^V2 + .5)
F5C5  50030 V$=RIGHT$("{7 SPACES}"+STR$(V4),V1
      +V2+1)
77AB  50040 IF V2<1 GOTO 50080
D44A  50050 FOR V5 = V1+2 TO V1+V2+1 : IF ASC(
      MID$(V$,V5))<48 THEN NEXT V5
0A69  50060 V6=V5-V1-1
72CC  50070 V$=MID$(V$,V6,V1+1)+LEFT$(".00000"
      ,V6)+MID$(V$,V5)
8008  50080 IF ASC(V$) > 47 THEN V$=LEFT$("***
      ********",V1+V2+2+(V2=0))
7E79  50090 RETURN
```

Output To Devices

The above code will work well when you output to devices, too: to printer, modem or disk file. All you need to do is to change PRINT to PRINT#... and you're in business.

Sending formatted information to disk files is good and bad. On the good side, your can "spool" the file directly to the printer, since it's in looking-good format already. You can use one of many sort utilities to sort the data on a selected "column"; the data is arranged neatly for that kind of use. But there are drawbacks. The file will take up more room on disk (all those filler spaces), and you'll need to do a little more work to read it back as a data file.

Splitting a formatted input line back into its individual variables isn't hard. For example, to extract a substring from character positions 10 to 18 of input string X$, you'd use MID$(X$,10,9); a little more work might be needed to clean off the spaces at the end of the string.

Extracting a number takes one more simple step: to extract a numeric value in columns 19 to 24 of X$, you would use the expression VAL(MID$(X$,19,6)).

Binary, Not Characters

Sometimes you need to send binary values rather than printable characters. For example, you may find that your printer is able to do a number of interesting things if you send it some binary codes—usually starting with code 27, the ESC character. In a more advanced area, you would need to send a binary value to the disk command channel in order to open a relative (REL) file with a specified record length. A length of 124 would NOT be sent as characters 1, 2 and 4; instead, it must go in binary as CHR$(124).

As this example suggests, numbers in the range of 0 to 255 may be coded with the CHR$() function. Larger numbers need a little more work. We'll see this at a later time when we get into relative file coding. But not yet: relative files hold many pitfalls for the beginner. They will be covered in detail in the future.

You might like to try some simple printer exercises. Different makes of printer need different codes to trigger their features. One that is found on many printers is the TAB function, binary 9. You might like to try:

```
OPEN 4,4
PRINT#4,"THIS";CHR$(9);"IS FAR OUT"
CLOSE 4
```

If your printer is compatible in this respect, you'll see the words "IS FAR OUT" have been positioned to the next tab position, typically position 8.

You might like to look through your printer manual; it's likely that you'll find a number of special code sequences that can trigger special effects.

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Carrier Detect

A COMPRESSED HISTORY OF THE INTERNET

By Jim Brain

The "Internet". You've heard about it. You've been told that it will come into every home in the future. Article after article have described the best and worst aspects of this mysterious network. People are now giving you their Internet e-mail address after they give you their phone number. Books on how to hook into it and use it have cropped up everywhere. Yet, many of you are simply wondering where it came from.

It is true that the Internet is mysterious, but that will soon change (or so I hope). The key to unraveling the mystery lies in learning the history. But, before we start, let's peek at the state of affairs during the "birth" of the Internet in 1960.

In the 1960's, Ma Bell (Bell Telephone) had a monopoly on telephone lines and usage. Also, residential phone usage was subsidized by the business phone system, which meant higher costs for businesses using phone systems or phone lines.

The integrated circuit was yet to be invented, so the new-fangled computer systems of that day were manufactured using transistors and vacuum tubes by big companies like International Business Machines, Inc. and Digital Equipment Corporation. Since the computer was relatively new and few had been sold, most companies did not exploit the full power of the computer. As for most people, they scarcely knew what computers did. Also, since the computer had not matured, most companies could not imagine the power of linking computers together over large distances. Thus, any networking of computers and peripherals was done using proprietary techniques for encoding and transmission, much like the proprietary nature of Commodore's serial bus.

A little closer to home, Jack Tramiel of Commodore was expanding his typewriter business to include adding machines, which were electro-mechanical. The Commodore PET computer was not even an idea in Jack's head, since the necessary components had not been invented yet. Keep that in mind as we travel back to...

The 1960's

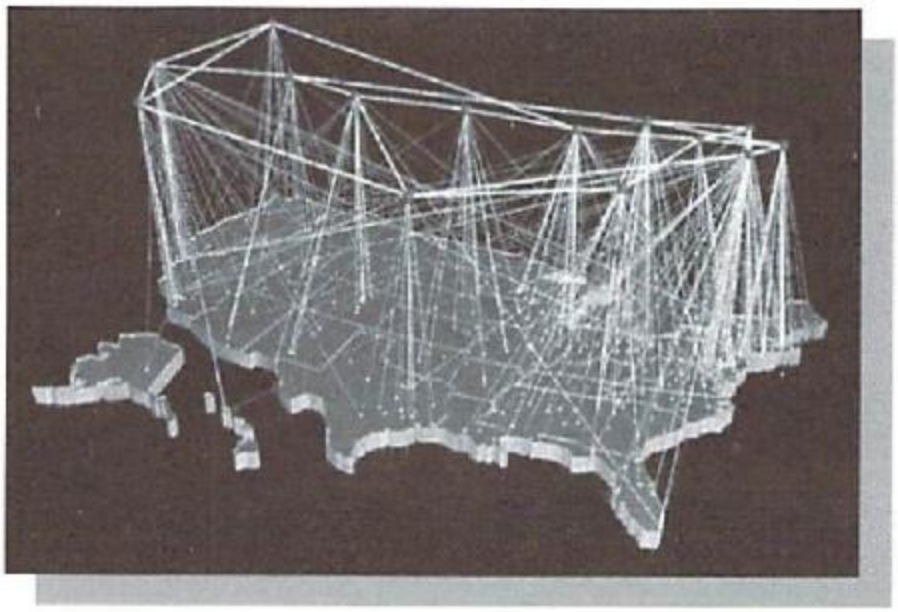
The United States and U.S.S.R are in the midst of the "Cold War", and each side is planning for a dreaded nuclear war. The U.S. government worries about how its offices and bases will stay connected after an attack. To search for answers, the government poses the question to America's foremost think-tank, RAND Corporation.

In 1962, Paul Baran of RAND Corporation describes a method of increasing reliability in telephone networks in the event of nuclear war. Out of his research comes the idea of breaking information into "packets" that can each be addressed to its destination. The best analogy would be letters at a U. S. Post Office. Each packet (letter) would contain a piece of the message, so the chances of parts of the message arriving at the destination would be increased. Of course, the receiver would have to request retransmission of any missing parts, but something was better than nothing. As the years progress, the construct of packetizing information results in the implementation of packet switching, a process where many people share a single data path. The packet switching unit splits the user's message into packets and addresses each packet. The packets are sent with everyone else's, and the unit at the other end reverses the process. This reduces the cost of data communications considerably.

In the mid 1960's, a man by the name of J. C. R. Licklider suggests the idea of linking computers together to share the resulting packet switched networks. This notion is turned over in many a mind, and in the spring of 1967 at the University of Michigan, the Advanced Research Projects Agency Network (ARPANET) is conceived.

In 1968, the Advanced Research Projects Agency of the U. S. Department of Defense (DoD) awards a contract to develop the ARPANET to Bolt, Beranek, and Newman Inc. (BBN), a Cambridge, Massachusetts think-tank. This network will help keep information flowing throughout America in time of war. It will also be useful in peacetime, since it will help researchers:

- share data instead of duplicating it
- minimize development times.
- encourage cooperation among institutions working on different parts of the same contract.



OK, stand still for a family portrait. With the Internet, that's hard to do. In any case, the pictorial map at right indicates the complexity of the Internet network system. Each line represents a data path in the U.S. portion of the network. Notice the large lines criss-crossing at the top of the map. These lines represent the high-speed NSFNET backbone.

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Since ARPA is funding the project, the network will be built according to defense regulations. This means that the system must be decentralized to withstand attacks, must degrade gracefully under unexpected loads, must handle errors from any source, and must perform under less than ideal conditions, even to the point of partial loss of the physical network. The result is a very rugged networking system.

The working plan becomes this: the network will be comprised of multiple telephone lines connecting specialized hardware called "nodes" together. These nodes will accept messages from computers hooked to the node. The messages will be split into packets prior to transmission, with each packet containing a destination address and the packet's location within the original message. The node will then transmit these packets to their destinations. At the destination node, the original message will be reconstructed from the individual packets, and the message will then be sent to its ultimate destination. The network will not guarantee successful delivery of messages, so protocols must take this into account. Also, to boost reliability, packets of a single message may travel over different paths to their destination.

The year in 1969. The country is still recovering from the euphoria surrounding the climactic landing of the first man on the moon. Late in the year, the efforts of the network contract pays off as the first ARPANET node is installed at the University of California at Los Angeles. Three more nodes are installed at the University of California at Santa Barbara, Stanford Research Institute, and the University of Utah. These four machines comprise the entire ARPANET.

The 1970's

In 1970, three more nodes were added on the East coast. They were located at the Massachusetts Institute of Technology, Harvard University, and Bolt, Beranek, and Newman. This brings the total up to seven. The seven machines are known as Interface Message Processors (IMP), and the protocols used are the Network Control Protocol (NCP) and the Host-to-Host Protocol.

By 1973, the ARPANET has grown to 25 machines all over the U.S. For a while, the network is used for its original purpose, to help researchers share information on government contracts. As time goes on, its use expands to include other types of research and personal uses, most notably electronic mail. The ARPANET becomes its own entity and garners a following of researchers and scientists. It becomes a status symbol to have an account on the ARPANET. It is also expensive. Costing $250,000 a year to maintain a network connection, only big research facilities can afford to be "on the net."

The year 1973 also ushers in transatlantic communications, as England and Norway are brought on-line. The ARPANET has now stepped outside the boundaries of the U. S. At first, the milestone goes unnoticed, but years later it will prove to be a great testament to the power of networking.

As the 1970's wear on, the number of machines on the net is rapidly approaching its maximum, 256. Also, the NCP protocol is ill-designed to keep up with the amount of traffic now flowing over the network. Clearly a successor protocol to NCP is needed.

Vinton Cerf and Robert E. Kahn describe their ideas on this successor protocol in a technical paper published in 1974 for the International Networking Group (INWG). The newly renamed DARPA (Defense ARPA) contracts Cerf and Kahn to develop a new protocol.

Cerf and Kahn concentrate first on the NCP address field. An NCP packet contains the destination machine's numerical address on a one-byte field. This constrains the ARPANET to 26 machines. The design team decides that this field should be increased to 4 bytes in length. Also, this 4 byte address should be divided into a network portion and a host portion. This will allow institutions to build "mini" ARPANETs within the facility and hook every machine to the ARPANET.

How Fast Is it Growing?

The Internet's expansion has skyrocketed since the introduction of the NSFNET backbone, and doesn't show signs of stopping anytime soon. Here are some statistics on the growth of the Internet since its inception in 1969.

Year	Number of machines
1969	4
1970	7
1973	25
1974	62
1977	111
1981	213
1982	235
1983	562
1984	1,024
1985	1,961
1986	5,089
1987	28,174
1988	56,000
1989	159,000
1990	313,000
1991	617,000
1992	1,136,000
1993	2,056,000
01/1994	2,217,000

Note: data collected after 1987 are estimates from collected figures.

The 1980's

In 1981, some new faces appear on the horizon. BITNET (Because It's Time Network) and CSNET (Computer Science Network) sprout up and hook into the ARPANET. These three networks become the major players amidst a sea of smaller ones. However the added coverage comes at a cost: the number of machines on the ARPANET has almost exceeded the limt of the NCP protocol. Fortunately, a solution is nearing.

In 1982, the final design of the new ARPANET protocol is finished and implemented. It is christened the Internet Protocol (IP). IP is one of 4 protocols that have been designed. The others work on top of IP. They are: User Datagram Protocol (UDP), Transmission Control Protocol (TCP), and Internet Control Message Protocol (ICMP). UDP provides the non-guaranteed service that was previously provided by the NCP protocol. TCP provides a more robust guaranteed delivery service, and ICMP lets machines return error conditions across the network.

Enter the year 1985. The National Science Foundation decides that easy access to massive computing power for researchers is need. To do this, the NSF creates 5 supercomputer sites across the country. This move will give researchers more access to the computing abilities that only machines like the Cray I (A large supercomputer manufactured by Cray Research, Inc.) can provide. In the past, only large corporations and weapons developers had access to these resources. The NSF installs machines in Champaign IL,. Ithaca NY, Pittsburgh PA, Princeton NJ, and San Diego CA. Since the machines need to be accessible to researchers, each machine is connected to the ARPANET.

Shortly after the supercomputers come on-line, the load introduced by the new machines exceeds the ARPANET's capacity, even with the new IP protocol. To solve the problem, NSF quickly engineers a temporary network that ties all of the NSF computer sites together. This temporary network, known as the original NSFNET backbone, removes the excess load from ARPANET. However, to remain accessible to researchers, the NSFNET ties into the ARPANET at Carnegie Mellon, which is connected to both networks.

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Now, this new backbone is only considered a stopgap measure, instituted to allow researchers to access the supercomputers until a new NSFNET backbone can be deployed. The NSF notes that the supercomputers require network capacity orders of magnitude larger than the ARPANET, which runs at 56,000 bps at present. Therefore, the new NSFNET will run 20 times faster.

The year 1987 rolls around. The NSF issues requests for proposals from groups who want to establish the new NFSNET. On November 24, 1987, NSF announces that it has selected a partnership to implement the new network The partnership consists of: MERIT Inc., a Michigan state computer network operator, IBM Corporation, a computer manufacturing giant, and MCI Inc., a long distance telephone carrier. The partnership designs and installs the new NSFNET, which starts operating during the summer of 1988. Soon afterward, the original NSFNET is taken out of service and disconnected.

In 1989, the NSFNET undergoes some relatively minor changes. Traffic flows on the NSFNET have been measured, and the resulting data is used to add and delete connections, thus maximizing the use of the network. Also, to boost reliability, each site is now given redundant connections to the network. Finally, the capacity is further increased, resulting in speeds of 1.544 Mbps (27 times faster than the original ARPANET).

The 1990's

Out with the old, in with the new, as they say. Well, as 1990 comes into view, the original ARPANET comes to an end. Over the years, the original ARPANET has been subsumed by the NSFNET and the many smaller computer networks that have sprung up and connected into it. This resulting maze of networks is collectively titled the "Internet." From this point on, less and less attention is paid to the individual network identities. No longer is it the playground of the elite and scientific. It is at this point that the actual number of machines attached to the net becomes ambiguous (see sidebar "How Fast Is it Growing?"). In addition, businesses are coming on-line, and the number of users is skyrocketing.

As businesses come on-line, they hit a roadblock. The NSF is enforcing an Acceptable Use Policy (AUP) on all packets that travel over the NSFNET portion. This AUP prohibits any uses related to commercial business. Since the businesses can't use the NSFNET for commercial endeavors, General Atomics, Performance Systems International, and UUNET Technologies creates a new network that bypasses NSFNET for such traffic: the Commercial Internet Exchange (CIX) network.

With that we come to the present, 1994. The NSFNET backbone now runs at 44.736 Mbps, which is 30 times faster than it ran in 1990. Also, the NSF has decided to turn over funding of the NSFNET to the private sector and lift the AUP. This has both good and bad consequences. The NSF has been funding $18-20 million of the cost of the NSFNET, so this money must be collected from new sources. However, the lifting of the AUP will encourage businesses to use and pay for the NSFNET.

Happy Birthday to I

The Internet celebrated its 25th birthday in September, 1994. So, the Internet is older than most people think. However, only since the creation of the NSFNET and the CIX network have people been given the chance to actually use the network. These events and the ever-increasing number of people using the Internet has made it "noticeable" Now that it has been noticed, some people are scurrying to find uses for what they consider a long-lost treasure.

In many ways, the Internet in the 1990's is much like the New World in 1492, after Christopher Columbus discovered it. Some people, when first made aware of the existence of the Internet, charged that it was a hoax and that it was not possible. Others gasped in awe at the massive speeds and breadth of coverage of the Internet. People are coming on-line in droves, and some are unknowingly upsetting the delicate balance that exists in the Internet. This balance concerns information and its dissemination. Though, as time goes on, you can rest assured that the Internet will overcome this much like it has surmounted previous obstacles.

Does the Internet have a future?

The present slowly turns into the past, and the future likewise becomes the present. As you sit here reading this, the future of the Internet is being planned and implemented. The NSF is removing both its funding and the AUP, while creating a new high speed backbone called the vBNS (Very High Speed Backbone Network System) that will run at 155Mbps. This new network will service researchers who need the extra speed to complete projects using the NSF supercomputers.

Not only will a new network emerge, but a new protocol for the Internet will be introduced as well (see sidebar "4,294,967,296 Isn't Big Enough!"). One of the most promising specifications is IPng (Internet Protocol Next Generation). Designed by many of the same people who worked on IP, the new protocol will reflect the changes in use that the Internet has seen.

The Internet's name may change as well. At this time, the National Telecommunications and Information Administration is accepting proposals for the National Information Infrastructure (NII), which is the correct term for the "Information SuperHighway." Possibly, the Internet will form a large part of this new network that will go into every home and business.

Well, lest you think that this is all of the history behind the Internet, let me assure you that one article cannot do justice to this subject. I have attempted to describe the more shaping events, while leaving equally interesting but less influential items out. In fact, many books have been written on just parts of the history.

I believe a knowledge of the Internet's history serves a very important purpose. A knowledge of history sometimes describes the culture that has evolved. It is this way on the Internet. Too often people hop on without finding out how things operate inside the network, and they find out the hard way. As I would like to see Commodore users hop on as well, this is my attempt to smooth the bumpy road to success on the Internet. Once you've arrived, look the Commodore gang up and say "Hi."

4,294,967,296 Isn't Big Enough!

One of the reasons that a successor to the IP protocol is being developed concerns the IP address, a 32-bit number that uniquely identifies each machine connected to the Internet. While 32 bits provides a unique numerical address for over 4.2 billion machines, researchers claim that the numbers will run out sometime in mid-1995. Now, this doesn't mean that there'll be 4.2 billion machines connected to the Internet in mid-1995. Because the Internet Network Information Center (InterNIC) assigns IP addresses in groups, not all addresses in a group are used. Therefore, the InterNIC will run out of groups of numbers to assign in mid-1995. This is indeed a problem, thus new protocols being developed will have much larger address sizes.

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Over The Edge

By Don Radler

PONDERING THE PENTIUM

Just as Christmas buying was promising to make the holidays happy indeed for the computer industry, Intel Corp.'s high-speed Pentium chip slammed into a brick wall of consumer resistance. The Pentium, computerdom's fastest and most powerful kid on the block, had a bug.

After chasing the problem for months, Intel downplayed its significance and refused to replace any of the less-than-perfect chips unless the customer could justify his need for it.

Attributing its own reaction to Intel's alleged understatement of the problem, IBM rushed to announce it would no longer ship PC's based on the Pentium chip.

Other manufacturers, such as Gateway, told customers that replacement of the chip was somehow not a warranty responsibility, but an upgrade.

Computer consultants such as the Gartner Group leapt in with recommendations to their corporate clients that they defer large buys of Pentium-based PC's until debugged chips become available.

State authorities such as Florida's attorney general, citing substantial confusion over the reliability of the chips, raced to demand more information from Intel.

And home PC consumers, now more confused than ever about what to buy, backed away from buying anything at all.

At this writing, it appears that the bug in the Pentium chip was the glitch that stole Christmas 1994. Worse — it made consumers question the very value and reliability of computers, if not the worth of all technology.

The sad thing is that none of this had to happen. Intel spent a year and a bundle of money trying to track down the Pentium bug. But when they found it in mid-1994, they didn't immediately offer to replace the chips already sold. By Intel's estimate, the wrong result in some floating point calculations might turn up only once in 27,000 years. Therefore, they reasoned, nothing had to be done except in special cases.

IBM claimed that the chip's errors could occur much more frequently — once every 24 days, in fact, and not just in higher mathematical uses, but in ordinary business accounting. IBM's own role as a chipmaker might have affected its calculations: Big Blue is, after all, a player in the high-stakes microprocessor game.

Companies like Gateway could have helped many customers replace Pentium chips with coaching by phone, or could have done the whole job under warranty for those who felt incapable of doing it themselves. Instead, they sought to redefine the word "defective" and ignore the meaning of the word "warranty".

Consulting outfits certainly knew their clients would hold off on Pentium buys until the flap was over: large-scale corporate computer buyers aren't babes in the woods. The consultants' self-serving "advice" was unnecessary and harmful to the industry: in the long run, the marketplace will be dominated by home PC sales; scaring off these buyers can't help anyone.

State regulators don't belong in the act at all: no damage has been shown to have occurred to anyone and the issue, if there is one, is probably under federal, not state, jurisdiction. But politicians can't resist a chance to act as knights in shining armor, even when no maiden has asked to be rescued.

Nevertheless, the heat got to Intel, which finally announced on December 20 that it would replace any Pentium chip, no questions asked. End of flap? No way. Consumer confidence, just beginning to develop, has been eroded. Intel's unbecoming delay, IBM's opportunistic rap and Gateway's cynical word game might have saved a few dollars now, but will cost many more dollars from now to the year 2000 and beyond. And those computer consultants and politicians who inserted themselves into the flap just for show aren't worthy of further comment.

Which brings us to the consumer. What can he make of all this, and what, if anything, can he gain from it?

First, home PC buyers need to recognize that they simply don't need all the speed and power that manufacturers trumpet so loudly. For many uses, the good old Commodore 64 will do everything a user wants done. In other cases, a Mac or IBM-compatible may be called for, but the older Mac's 68040 microprocessor or the IBM's 486SX chip (or even the 386) will do the job. Cost? About $900 to $1500, compared with the over-$2000 price tag of machines based on the 60Mhz PowerPC 601, 80486 DX2-66 or Pentium chips.

Home computerists should ask themselves if they're buying speed and power because they need it or just to keep up with the Joneses. (Indeed, they should ask themselves who the Joneses are.)

Next, all PC users need to understand that chips are now so complicated that bugs are just about inevitable. The Pentium, for example, is comprised of more than three million transistors on a silicon slice about the size of your thumbnail. If some of the electrons moving through any of those transistors don't act the way they should, there's a bug.

Finally, people who buy computers for home use must recognize that their demands for the leanest, meanest machine in the world encourage manufacturers to push speed and power at the expense of safety and precision. Does any of this sound a little like the car business?

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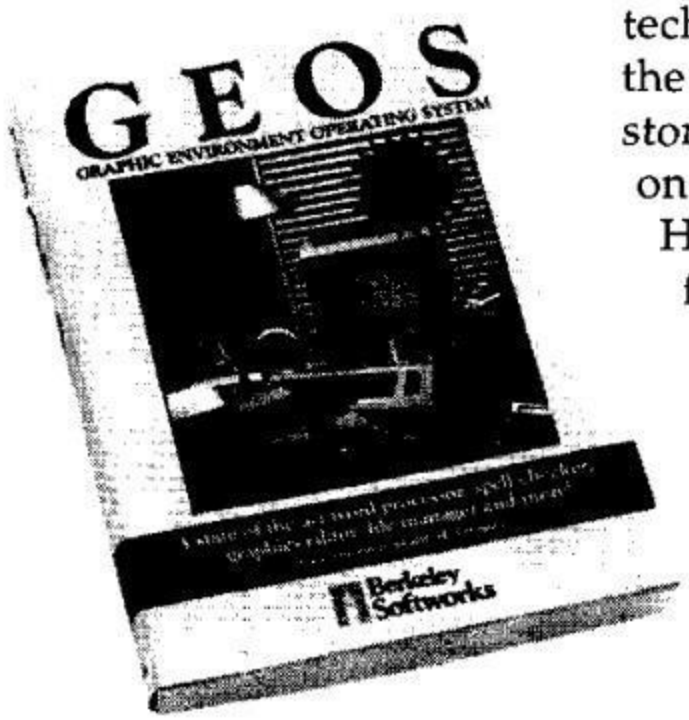

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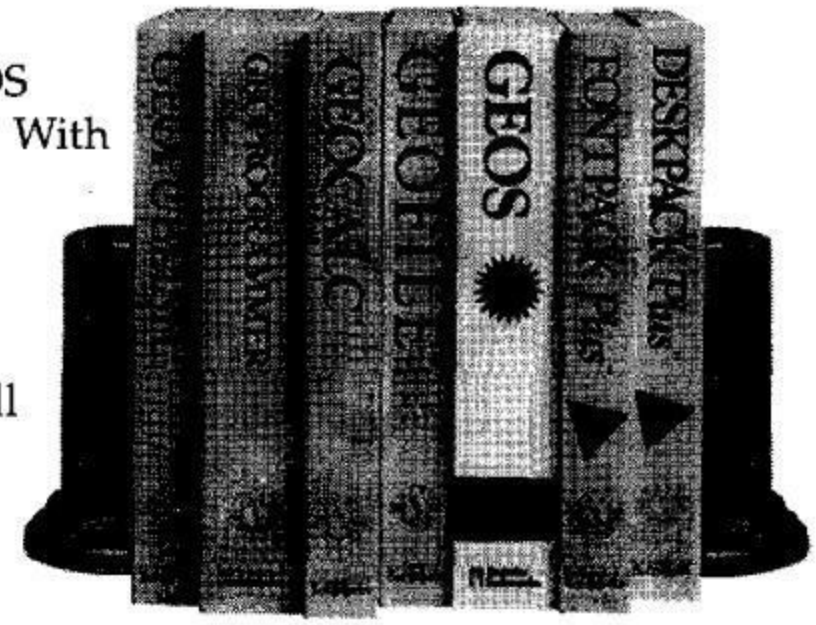

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